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Heat Treating Automobile Parts

Fourteen Furnaces, All Electric But One, Treat Gears,
Pinions and Axles for Oakland Cars—One
Furnace Has Double Deck

BY F. L. PRENTISS*

A HEAT-TREATING department, equipped with 14 furnaces, all except one electrically heated, was recently installed by the Oakland Motor Car Co., Pontiac, Mich. They are used for heat treating gears of

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various types, rear axle shafts and other parts, formerly made elsewhere, but now manufactured in the Oakland plant. The furnaces are of various types for normalizing, carburizing, hardening and drawing. There are also three electric cyanide pots for hardening. The installation in-

L OADING End of the Rear Axle Shaft Drawing Furnace. From the hardening furnace, shafts pass to oil-quenching tank and draining platform, on way to drawing furnace



R EAR Axle Shafts Are Heat Treated in a Continuous Pusher-Type Automatic Electric Hardening Furnace in Which the Pieces Are Placed End to End Going Through the Furnace Lengthwise Instead of Crosswise as Is Usual in Heat Treating These Round Shafts. The charging end of the heating-furnace is shown at the left and the discharge end of the drawing furnace at the right

cludes overhead conveying equipment for handling the work through the different operations and between the furnaces.

Axle Shafts Pushed Lengthwise Through Furnace

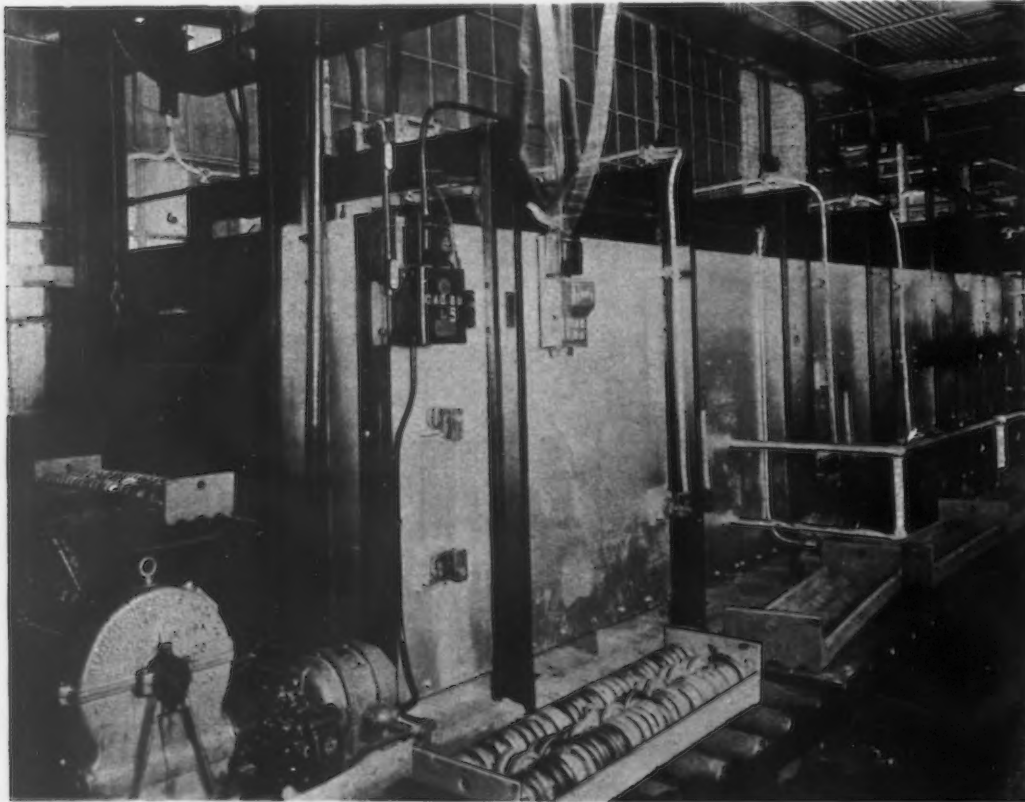
A departure from the usual method of handling the pieces through the furnace has been adopted in furnaces that are used for heat treating rear axle shafts. These are usually pushed crosswise through the furnace and, as they are round in form, trouble is sometimes caused by their piling up while being pushed through the furnace. In these furnaces the shafts are pushed through the hearth lengthwise in grooves.

The unit for heat treating rear axle shafts consists of a continuous pusher type 220-kw. hardening furnace, a quenching tank, conveyor and a 150-kw. drawing furnace. These have a capacity for heating, quenching and drawing

cally kept below 90 deg. Fahr. The cooling system has four temperature checks; one on the water going in, one on the water discharged, one on the oil supply and the fourth on the oil return. There are two oil circulating pumps, one of which is used as a spare. A strainer is provided to take out scale at the suction point.

Oil-Fired Pusher Furnace Normalizes Gears

Differential parts including ring gears, pinion gears and side gears and also gear shaft levers are normalized in a continuous oil-fired furnace of the automatic pusher type 30 ft. long and 30 in. wide, inside dimensions. The work is put in standard sized carburizing pots 11 in. in diameter and 9 in. deep and covered with enough carburizing compound to prevent oxidation at a high temperature so that sand blasting or pickling is not required to remove the scale. The furnace temperature is 1500 deg.



LOADING End
of a Continuous
Automatic
Pusher-Type Electric
Furnace for
Annealing Transmission
Gears, Through Which
the Work is Con-
veyed in Pans

2000 lb. of shafts per hr. Each furnace is 20 ft. long and 52 in. wide, inside dimensions. They are completely automatic in operation and control.

There are 24 grooves in the bottom of the furnace hearth and shafts are fed into the furnace four at a time, one in every sixth groove. A furnace attendant places the shafts in the grooves that extend outside the loading end, and when the pusher shoves the four shafts forward the lines of shafts in the corresponding grooves in the furnace are moved a shaft length forward, the last four being pushed out at the discharge end. Dials numbered from 1 to 6 operate automatically at the front end of the furnace and indicate to the operator which grooves are to be loaded.

Axles are discharged from the heating furnace down an incline into an oil quenching tank without coming into contact with the atmosphere. From here the material is conveyed to a loading and draining platform and pushed lengthwise through the drawing furnace, emerging at a point opposite the loading end of the heating furnace. The two furnaces are located side by side. The temperature of the hardening furnace is 1550 deg. Fahr. and that of the drawing furnace 1100 deg. Fahr.

Oil in the quenching tank is circulated through a Griscom-Russell Co. cooler and its temperature is automati-

Fahr. at the charging end and 1600 deg. Fahr. in the soaking zone.

The parts are kept in the furnace for 4 hr. 40 min. The pots are pushed through the furnace over rollers at the bottom of the hearth. At the discharge end they move on to a roller-equipped buggy which, when loaded, is shoved to one side of the furnace where there are four roller tables in parallel line with the furnace, these tables serving as cooling lines. From the buggy the parts are shoved on to one of these lines and the unloaded buggy goes back to its position at the discharge end of the furnace. After normalizing the parts are machined and then heat treated.

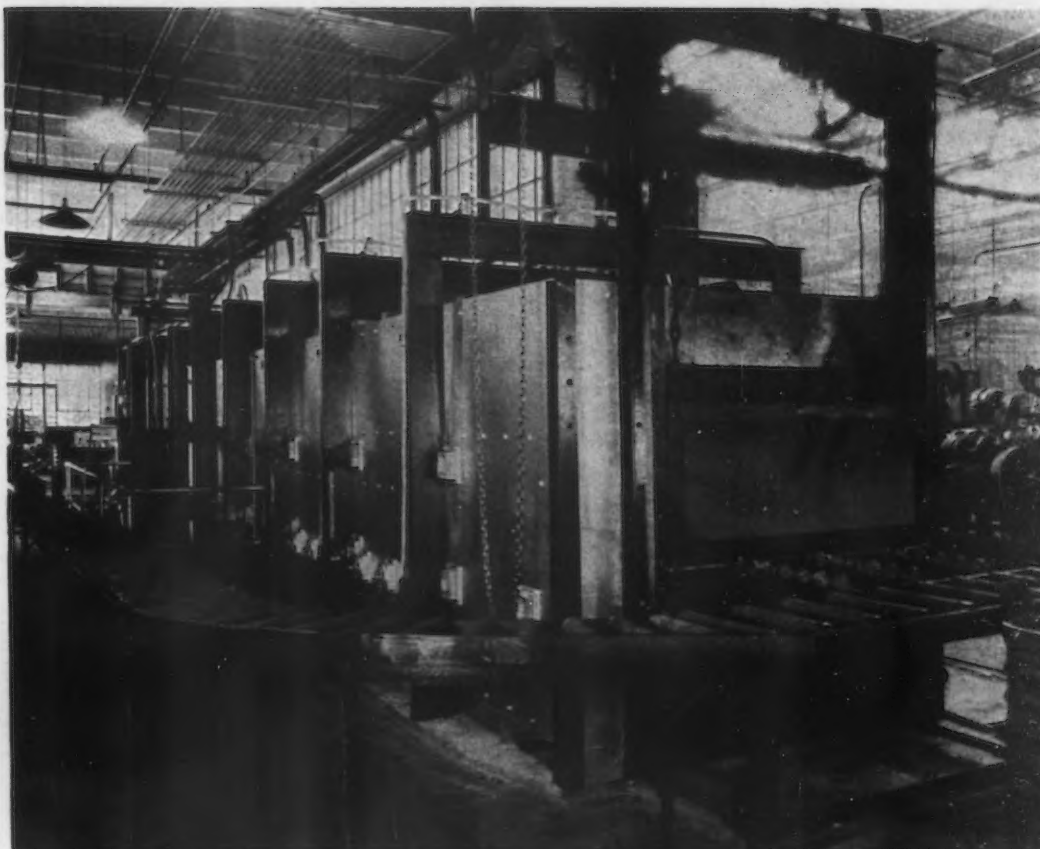
Gears Annealed in Continuous Pusher Furnace

Transmission gears are annealed in a 310-kw. continuous pusher type electric furnace. This furnace is approximately 45 ft. long. The heating chamber is approximately 10 ft. long and the soaking chamber 7 ft. long, the cooling and holding chambers taking up the remainder of the length. The forgings are conveyed through the furnace in overlapping chrome-nickel iron alloy pans on rollers, the hearth accommodating pans 42 in. wide. Each pan holds an average of 245 lb.

The furnace is provided with a motor-operated pusher

DISCHARGE

End of the Transmission Gear Annealing Furnace. This shows the application of a roller conveyor to loading and discharging



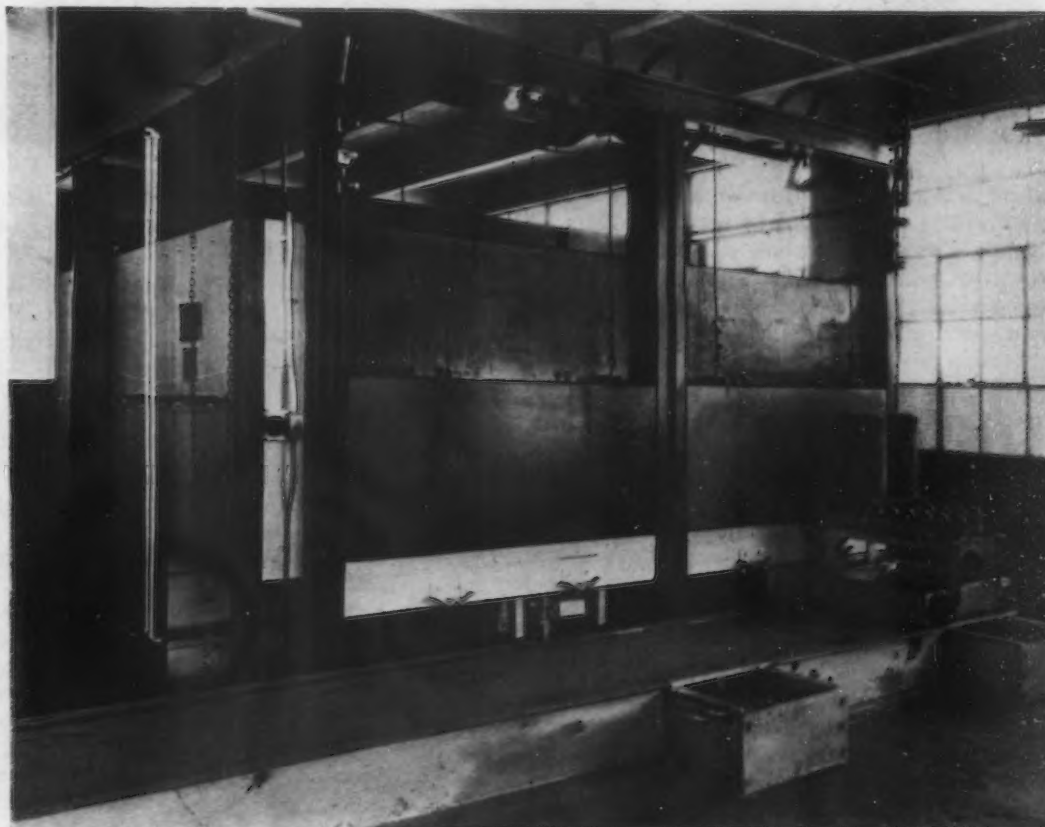
and door opening mechanism and a synchronous motor-operated timing device which automatically actuates the pusher at the desired time interval. The annealing cycle is as follows: Heat to 1650 deg. Fahr. and soak until the temperature is uniform; cool rapidly 250 to 400 deg. Fahr.; hold at resulting temperature until the cooling is uniform; cool slowly to the discharging temperature. This furnace has a capacity for heating 1800 lb. of steel per hr. to a temperature of 1650 deg. Fahr. The trays pass to a

roller conveyor at the discharge end of the furnace and down along the side of the furnace. The pans are loaded and unloaded on this table, which is served at the loading end by an electric hoist.

Recuperative Furnace Carburizes Pinions and Gears

Bevel drive gears, pinions, differential gears and miscellaneous other parts after annealing and machining are placed on a conveyor on which they pass through two

A Double Chamber Continuous Counterflow Recuperative Furnace Is Used for Carburizing Bevel Drive Gears, Differential Gears, Pinions and Other Parts. This is automatic in operation



washing machines built by the G. & M. Industrial Equipment Co., Detroit. They move along on this conveyor to a carburizing furnace, which is a 300-kw. double chamber furnace of the continuous counterflow recuperative type. It is completely automatic in operation. The inside length is 56 ft. 6 in. and each chamber is 5 ft. wide with a clearance of 22 in. in height. The heating chambers are 22 ft. 9 in. long. It is a double-ended furnace, being both loaded and discharged at each end. Two carburizing pots 11 in. in diameter and 19 in. deep are charged at one time, these being loaded on a 13½ x 25-in. tray.

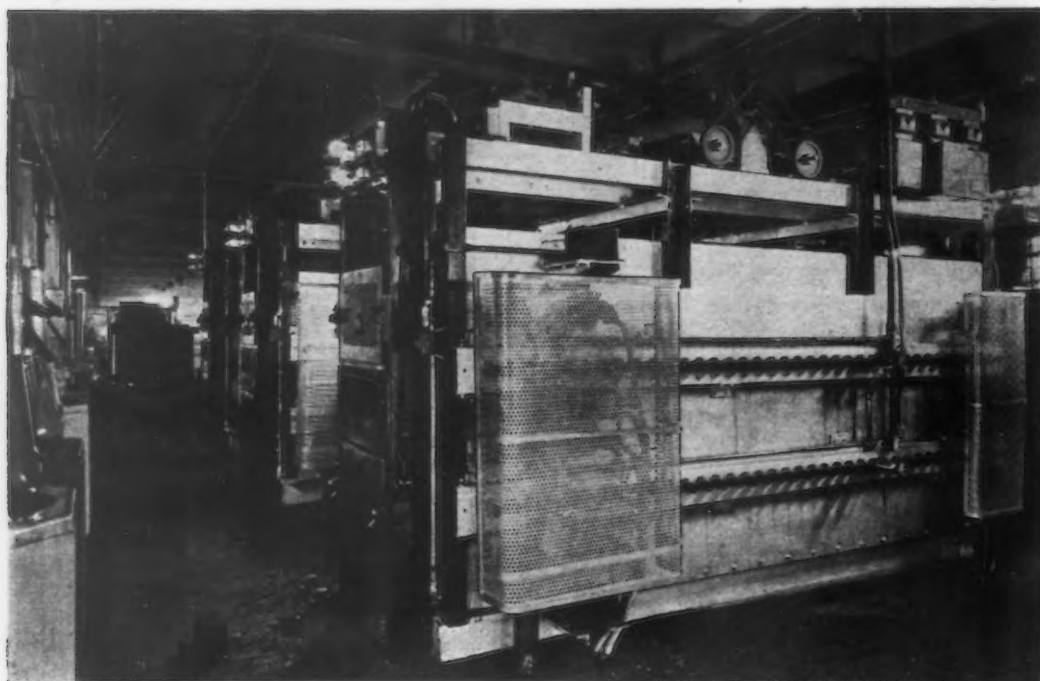
Pusher heads are hydraulically operated, being actuated by motor-driven Oilgear pumps and automatically controlled by an electric time clock. The furnace temperature is 1675 deg. Fahr. and the pots are kept in the high-temperature zone 10 hr. The maximum rate of production in 24 hr. is 96,000 lb. A case depth of 0.45 in. to 0.75 in. is produced, depending upon the part.

At the side of the furnace are two gravity roller conveyors, one for unloading and the other for loading. At right angles to these conveyors are tracks that extend

quenched in tanks of water or oil. Gears quenched in the oil tank are carried through the tank on a conveyor and, on leaving the quench, are hung on an overhead conveyor which carries them through washing machines. After washing they are cleaned with revolving wire brushes. Then they go to Homo drawing furnaces in which they are held about an hour at a temperature of approximately 300 deg. Fahr. Straightening and inspection follow drawing. The gears are then placed back on an overhead conveyor which takes them to the assembly line.

Electric Rotary Hearth Furnace

Transmission gears and parts are hardened by combination electric furnace and cyanide treatment. After machining they are hung on a conveyor which takes them to a 100-kw. rotary hearth furnace and are heated to a temperature of 1500 deg. Fahr. They are kept in the furnace from 30 to 60 min. This furnace has a hearth 18 in. wide and an area of approximately 23 sq. ft. The hearth ring is supported on conical rollers driven clockwise from a



D OUBLE Deck Roller Hearth Furnaces Are Used for Hardening Ring Gears and Various Other Parts. Advantages of furnaces with one chamber above another include saving of floor space. Quenching machines are shown at the left

along both ends of the furnace and on which loading buggies with roller tops move back and forth. The buggy is pushed to a point in line with the gravity conveyor and the tray, with its two carbonizing pots, is pushed from the gravity conveyor on to the buggy, which is then shoved to a point in front of the charging door. In unloading the operation is reversed.

Roller Hearth Furnaces Have Double Decks

After carburizing, the gears are hardened in a battery of three 120-kw. double-deck roller-hearth furnaces. All ring gears, differential parts and shafts go through these hardening furnaces. Each of these furnaces has two chambers, one above the other. The gears are carried through the furnaces on heat-resisting alloy rollers which are driven by a ratchet on the outside of the furnace. The heavy metallic heating elements are located both above and below the hearth. The hearths are 13 ft. in length between doors and 24 in. wide. In addition to a saving of 50 per cent in floor space, an advantage of the double deck furnace is that the operator can feed both chambers without changing his position.

Ring gears, after heating in these furnaces, are quenched in Gleason quenching machines; other gears are

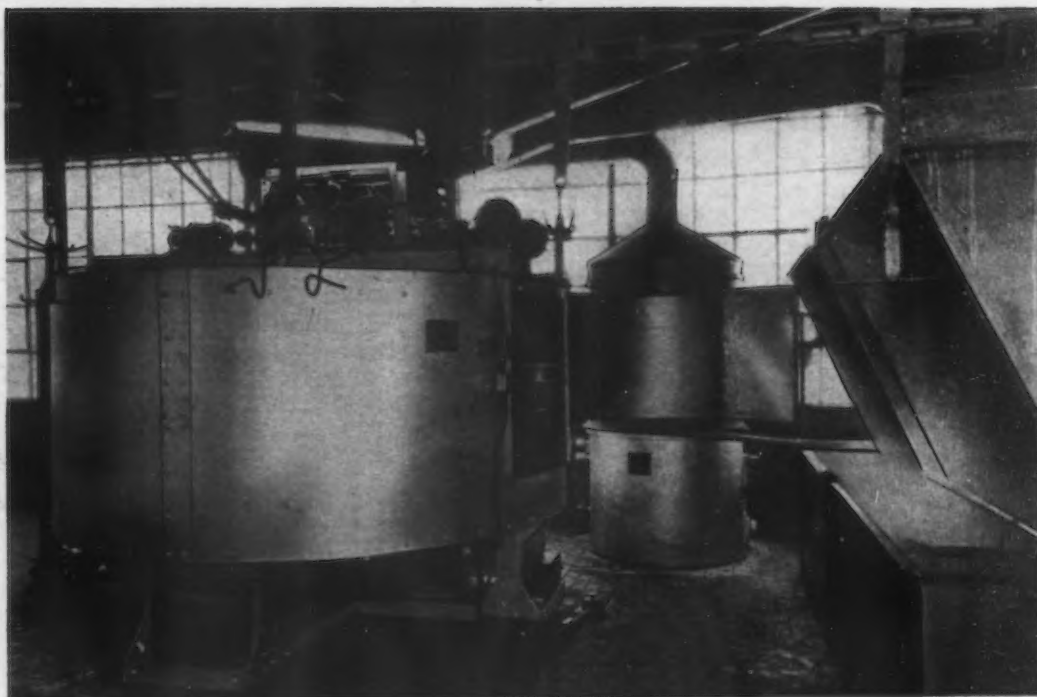
quenched in tanks of water or oil. Two individual motor-operated doors are provided for charging and discharging. These are operated by foot switches.

When taken from the furnace the gears are placed in a 30-kw. electrically-heated cyanide pot where they remain one minute. Quenching in oil follows. They are then suspended on a conveyor on which they pass through a washing machine, and after washing they are cleaned with revolving brushes. They then go to the Homo oil drawing furnaces, previously mentioned, as used for drawing ring and other differential gears.

Recording Apparatus Centrally Located

Recording instruments and switchboards are located at a central point, being placed in adjoining rows in an instrument room and conveniently located on the two sides of an aisle. Above the switchboards are the transformers. The recording instruments were supplied by the Leeds & Northrup Co. Time clocks for controlling the furnaces are located on the switchboards. The clocks were furnished by the Stromberg Electric Co. These recording instruments and switchboards control all the furnace equipment in the heat-treating department on the third floor, which does not include the annealing furnaces

ROTARY
Hearth Fur-
nace and Electric
Cyanide Pots
for Hardening
Transmission Gears. The
quenching tank is
shown at the right



and axle shaft heat-treating furnaces which are located on other floors.

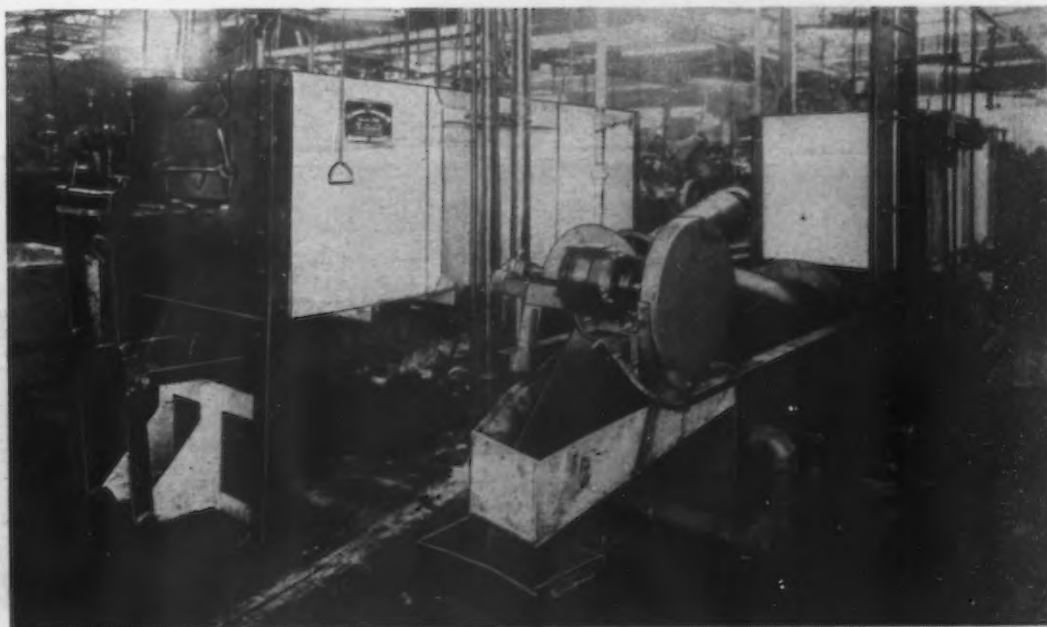
In one of the other buildings are two 35-kw. continuous pusher type furnaces for hardening piston pins, fan shafts and miscellaneous other small parts and shafts. A motor-driven pusher operating 7 different pusher heads pushes the parts through the furnace in V-shaped grooves located above the heating elements. The parts are discharged from the furnace down a chute into quenching tanks, the end of the chute terminating below the quenching medium. Entering the quenching bath, the work is received by a continuously running apron flight conveyor which carries it through the quenching medium and delivers it to the top of another chute about 2 ft. above the floor level. From here it drops into conveying pans.

The electric normalizing, the carburizing and the furnaces for hardening and drawing rear axle shafts, as well as the three double-deck hardening furnaces, the three cyanide furnaces and the two pusher pin furnaces were built by the Electric Furnace Co., Salem, Ohio. Three electric drawing furnaces were supplied by the Leeds & Northrup Co.



Battery of Temperature Control Instruments

CHARGING
End of Pusher
Type Furnace for
Hardening Piston
Pins and Other
Small Parts. The
quenching tank
shown serves a
second furnace at
the right



Big Shovel Uses Copper-Steel Castings

About 700 Tons High-Strength Castings and Equal Amount of Ordinary Structural Steel Required to Build 20-Cu. Yd. Shovel

DEVELOPMENTS in the manufacture of excavating machinery may be appraised by the accompanying table of dimensions of electric revolving shovels built by the Marion Steam Shovel Co., Marion, Ohio.

Year	Dipper	Boom, Ft.	Height of Bank, Ft.	Weight, Tons
1926	8 cu. ft.	90	40	
1928	12 cu. yd.	90	40	925
	20 cu. yd.	100	50	
1929	or 15 cu. yd.	120	70	1600

The 1928 shovel, which was illustrated in *THE IRON AGE* for June 28, 1928, page 1824, made a record digging 15,500 cu. yd. of overburden on a horizontal coal seam in 24 hr.; the 1929 shovel must handle at least 500,000 cu. yd. per month to prove economical in operation. In the opinion of the manufacturers, their equipment has been perfected to such a point that the major factor to be taken into consideration at present in determining the size of a shovel is the matter of economy in operation.

Weight Required to Prevent Toppling

Little change has been made in the general design of the 12-cu. yd. shovel to produce the 20-cu. yd. machine, or in the materials used in the construction. The unit stresses are kept about the same in the larger shovels as has been the practice of the Marion company in making the smaller models for many years past.

A shovel differs from a long steel bridge or an automobile, for example, in that there is not much of an incentive to save weight by substituting stronger steel in lighter sections. Nearly all of the weight is concentrated in the trucks, frame, rotating table and operating machinery, and this must amount to a certain figure with the center of gravity so placed that the shovel will not overturn when the dipper teeth are buried in the bank and



Shovel Has High-Manganese Steel Lip and Teeth; Copper-Steel Casting for Bale

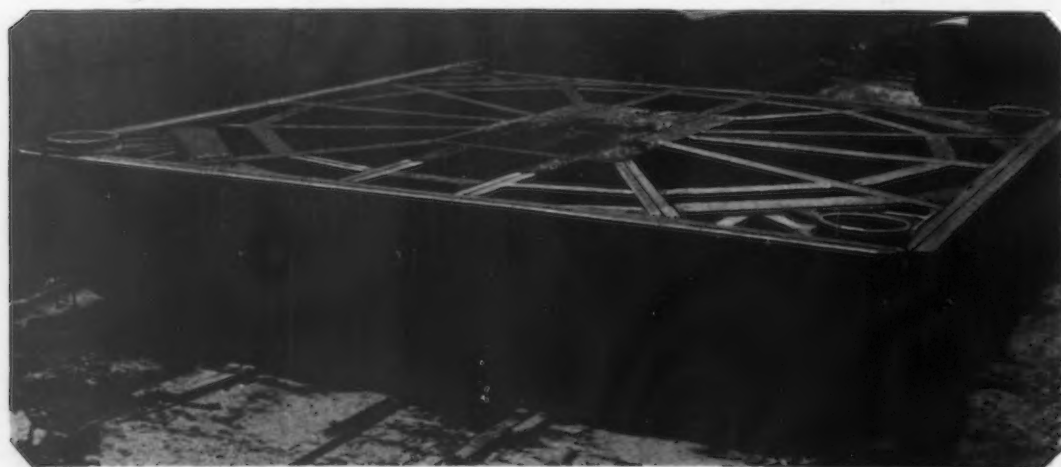
the 2-in. hoist line tugging away with full power of the winding drum.

If stronger material were used in these structural members, permitting the substitution of lighter sections, the weight thus saved would have to be replaced by more ballast at the rear of the upper frame. (In the 20-cu. yd. shovel approximately 200 tons of ballast is included in the 1600 tons total weight.)

Another factor that is taken into consideration in designing power shovels is that it is impossible to compute accurately maximum stresses because of the sudden and often very severe shocks the machine must withstand. Consequently an unusually wide margin of safety is provided.

Castings of Copper-Steel Used Extensively

Approximately half of the material used in the 20-cu. yd. shovel is alloy steel castings and half ordinary open-



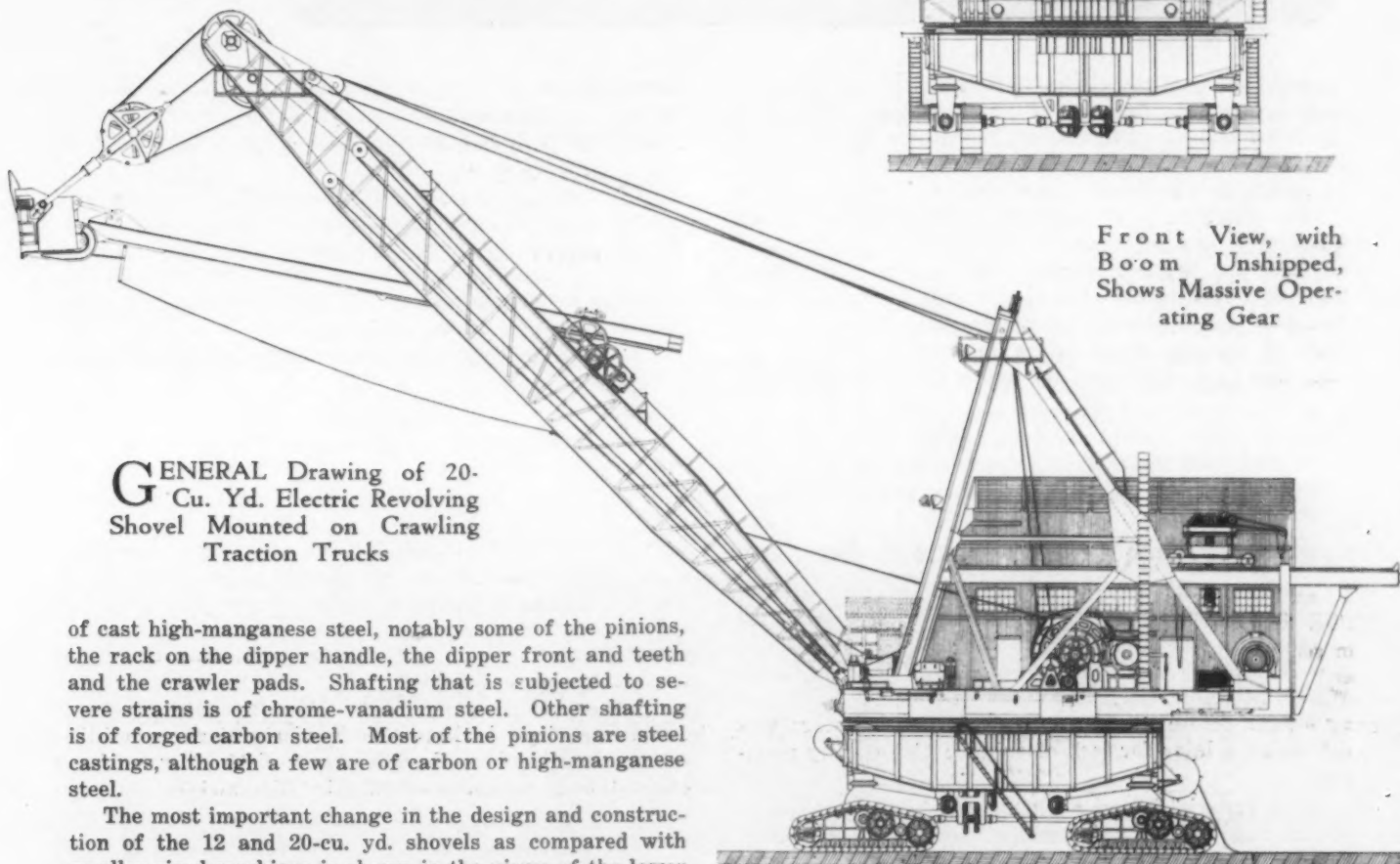
LOWER Frame of 20-Cu. Yd. Excavator of Structural Steel with Alloy Castings at Center and Four Corners

hearth structural steel. The castings for the most part are of a special copper alloy steel known as Kinnear 8-30 steel,* made in the company's plant in basic open-hearth or electric furnaces.

All the castings are heat treated and a wide range of physical properties is secured by varying the heat treatment. While the purpose of the heat treatment is usually to raise the elastic limit, some of the castings are heat treated to increase their hardness, ductility and machineability. The physical results obtained on this type of steel ranging in carbon from 0.25 per cent to 0.31 per cent will vary as follows: elastic limit 60,000 to 78,000 lb. per sq. in.; ultimate strength 90,000 to 105,000 lb. per sq. in.; elongation 22 to 26 per cent in 2 in., and reduction of area 40 to 60 per cent. Compare the above physical results with the American Society for Testing Materials' specification for medium carbon steel castings, which calls for a minimum elastic limit of 31,500 lb. per sq. in., ultimate strength 70,000 lb. per sq. in., elongation 20 per cent and reduction of area 30 per cent.

Certain parts that are subjected to hard wear are made

tached to its own crawler truck below. The side girders of the frame have two reinforcing members welded on—one is a cast steel plate that is strengthened by ribs on the outside. Below and welded to this is a steel plate which extends down and is welded to the lower chord angle. The primary function of this construction is to dis-



GENERAL Drawing of 20-Cu. Yd. Electric Revolving Shovel Mounted on Crawling Traction Trucks

Front View, with Boom Unshipped, Shows Massive Operating Gear

of cast high-manganese steel, notably some of the pinions, the rack on the dipper handle, the dipper front and teeth and the crawler pads. Shafting that is subjected to severe strains is of chrome-vanadium steel. Other shafting is of forged carbon steel. Most of the pinions are steel castings, although a few are of carbon or high-manganese steel.

The most important change in the design and construction of the 12 and 20-cu. yd. shovels as compared with smaller sized machines is shown in the views of the lower frame. On the machine with a 4-cu. yd. dipper the lower frame (shown just under the rotating gear) is a 20-ton casting machined down to 18 tons. The lower frame of the 20-cu. yd. machine is fabricated of structural steel and castings. It is 44 x 44 ft., center to center of girders, and its weight with crawlers, trucks and various operating mechanism is 400 tons.

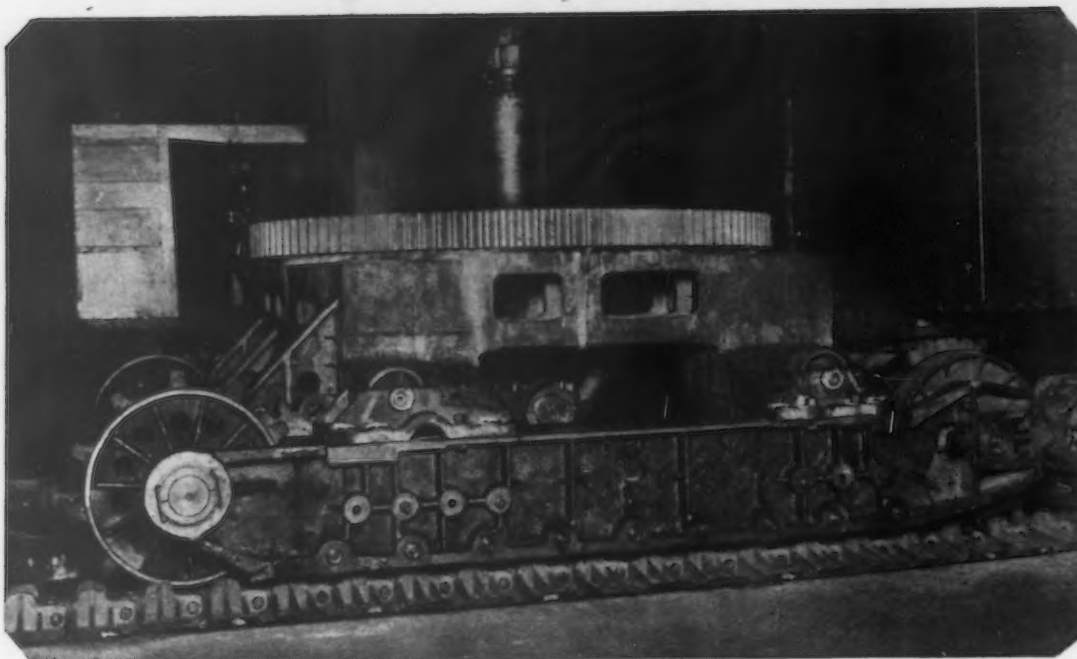
Center and Corners of Frame Are Massive Castings

The outside of the lower frame is built up of plate girders 98 in. deep at the center and 60 in. deep at the ends. These are held together at each corner by a heavy alloy steel corner casting extending the full depth of the frame. The corner castings serve as a base for the turntable roller patch and each one carries a cylinder for an hydraulically operated equalizing and leveling device at-

tribute the heavy load on the center of the top flange of the side girder and to carry the severe vertical stresses from the roller track down to the lower chord members without going through riveted connections.

The center casting has a bored hub to receive a hollow journal for the vertical propelling shaft. This casting is bolted and riveted to the two cross girders between which it is located, and to the 10 radial beams 63 in. deep, extending out to the main girders. The gear for rotating the entire shovel has external teeth and is composed of 24 segments. It rests on a series of 30-in. beams flush with the top of the lower frame. The rotating frame itself, which carries the operating machinery, boom gudgeons (in fact, the whole upper works), is built up of structural steel shapes and plates. Its girders are 50½ in. deep, the area is 32 ft. by 64 ft. The turntable is of the roller

*Patent No. 1,607,086; Nov. 16, 1926.



LOWER Frame
of 4-Cu.
Yd. Excavator
Is a Single 20-
Ton Casting

type consisting of rail circles 45 ft. diameter, each 3 x 6-in. cross section, one fastened to the upper frame and one to the lower frame, between which the double flanged rollers revolve. These rollers are of cast steel and are spaced by means of inside and outside channels rolled to circles.

The construction of excavating shovels of the present large sizes has necessitated much greater crawler bearing area and this has been provided with 8 crawler belts, two under each corner of the lower frame. Each of these four sets is comparable to the two crawler belts under the 4-cu. yd. machine shown in the illustration. The big machine has four trucks, one for each pair of crawlers, each

direct driven and steered independently. Their belts or pads are 3 ft. wide. The length of the crawler belt on the ground is 17 ft. 3 in. and the bearing surface of the 8 crawlers is 414 sq. ft.

The machine is equipped with a motor-generator set operating on 4000-volt 3-phase current that drives direct current generators supplying power for two 450-hp. hoisting motors, two 150-hp. swinging motors and two 150-hp. crowding motors, as well as for other power and lighting requirements. A 15-ton traveling crane is mounted over the hoisting and rotating machinery units for maintenance purposes.

Cast Steel Anchor Chain Made in Germany

An interesting demonstration of a new type of cast steel anchor chain, the use of which is now permitted in sea-going vessels by Lloyd's, the Germanischer Lloyd and Bureau Veritas, was made recently by the Jaeger Works, Elberfeld, Germany. Cast steel chains were made by Jaeger before the World War, but manufacture was discontinued later for lack of suitable high-quality material.

Such material is now available, and by improving also the casting process and introducing a heat treatment, chains of high quality have been produced which meet the requirements of the classification societies. These requirements demand, in comparison with wrought iron chain, an excess test load of 40 per cent and an excess breaking load also of 40 per cent.

Tests made at Hamburg included one chain 2.36 in. in diameter and another 1.77 in. While the breaking load for the larger size in wrought iron is 140 tons, it was impossible to break the cast steel chain with the maximum load of the Hamburg proving machine, which is 200 tons. At another test, made at the Berlin proving house, the chain broke at 266 tons. The smaller chain was able to stand 124 tons breaking load, or 155 per cent of the demanded load for a wrought iron welded chain of the same size.

There are three reasons for the superiority of cast chains over welded chains: (1) there is no welding connection in them, but the material is uniform through-

out; (2) the material itself is much superior in strength, as wrought iron suitable for making good welds lacks superior strength qualities; and (3) the stud is cast together with the link, and in one piece with it.

Repair of Large Bronze Bells

In an article in *Revue de Fonderie Moderne* a bell maker, P. Chambon, describes a method of repairing cracked bells used successfully by him and his father before him. In effect it is a process of "burning in" metal.

The crack is drilled and chipped and its edges thoroughly cleaned. A sand mold is then constructed about the bell, and held in place by iron bindings; the sheet metal is curved to fit the shape of the bell both inside and outside, so layers of sand no thicker than the bell metal itself are used.

The bell is then partially buried in sand over a fire so that the broken metal may be heated uniformly to a dark red. Molten metal of the same composition as the bell is then run from the top of the mold into the defective portion until sufficient has emerged from the bottom to indicate that the aperture in the bell is full. At the end of 48 hr. cooling the bell is found to be as solid in the part where the crack previously existed as elsewhere. In many repaired bells the clapper strikes the joint; records are included of a bell weighing two tons, which has been rung daily for 28 years with entire satisfaction, as to both tone and sonorous volume.

Foundry Saves by Change in Fuel

Tests Show Advantages Obtained from Close Control of Gas Heating—Unusually High Pouring Temperature Used

BY FRED M. REITER*

IN the past year the Dayton Steel Foundry Co., Dayton, Ohio, has undertaken a number of changes aimed to increase the production of better steel castings at reduced costs. Considerable study was made of the processes in operation and their possibilities before the gradual revamping of the plant was inaugurated. Several years may be required to complete the program contemplated.

Producing over 70 per cent of all the cast steel wheels used, this company to meet the demand must ship over 150,000 wheels annually. There is a possible variety of over 3500 different models, ranging from those for ½-ton light delivery trucks to 50-ton trailers.

Metal is melted in two 3-ton 'Lectromelt furnaces

*Dayton Power & Light Co., Dayton, Ohio.



under carefully regulated conditions and from specified and checked raw materials. The finished metal, of which 60 tons is produced daily, is held to these limits:

Carbon	0.23	to 0.25 per cent
Manganese	0.60	to 0.68 per cent
Phosphorus and sulphur..	0.045	per cent maximum

Owing to the fact that the sections are exceedingly thin, to minimize the weight of the wheel, the metal is poured several hundred degrees higher than is customary in regular steel foundry practice. The pouring temperature is 3200 deg. Fahr. The wall thickness of the ½-ton wheel is only 5/32 in., with a total finished wheel weight of 23 lb. Their largest wheel, that for the 50-ton trailer job, weighs 675 lb. and has a wall section of but 5/16 in. So good are the results obtained that only 3½ per cent of scrap is produced, and 65 per cent of the metal



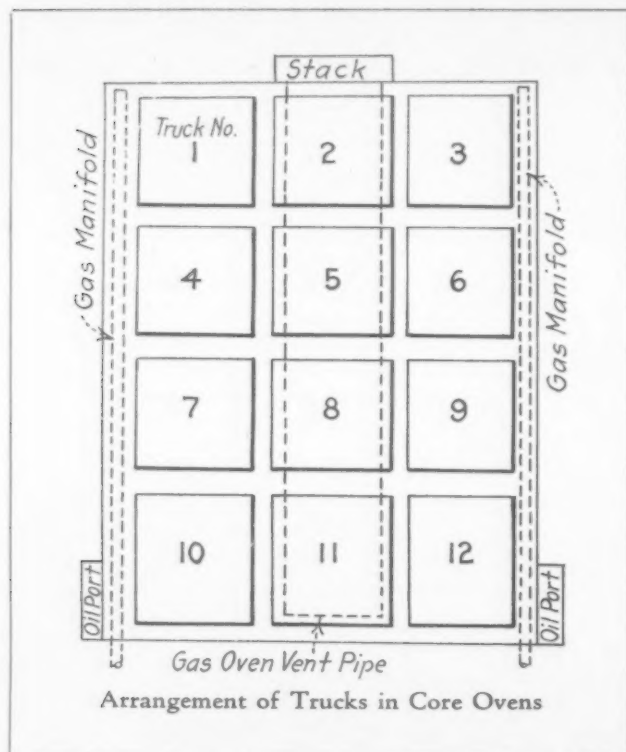
MOLDING
Is Done
Mechanically
with Machines
That Make
Molds Both
With and With-
out Multiple
Cores

poured leaves the factory in finished, machined wheels. The illustration at the top of the previous page is of a mounted dual-pneumatic wheel weighing 141 lb.

Seventy-five tons of sand an hour flow through the continuous sand slinging and molding machinery, with hourly laboratory control by standard American Foundrymen's Association tests.

The metal is poured without cessation, one 3-ton bottom-pour ladle being utilized for a complete 6-ton heat, without change of stoppers or nozzles. Often only 10 min. elapse between the finish of pouring one heat and the tapping of the other furnace for the next heat. The linings of the ladles withstand over 400 heats.

So far only two changes have been made in processes involving heat. The first of these was the system of handling and preheating ladles. The 1-ton tilting type ladles were superseded by 3-ton bottom-pour ladles, while the method of preheating was completely changed in



mode of firing, as well as the design and location of the heaters. This is described separately.

Electric melting of the steel was necessary because of the highly superheated condition of the metal when pouring. The metal is brought in the furnace to the specified temperature and analysis in 1½ hr.

Cores an Exceptionally Important Element

Owing to the peculiar design of the hollow-cast steel wheels, the cores play an unusually important part in the process. They must be carefully and accurately made, uniformly dried and economically baked. A hard or wet, or an imperfectly dried, core will cause endless trouble in the foundry. This is at once apparent when one considers that only 3/16 in. of metal lies between the core and the green sand mold. A bad core may cause misruns, cracks, tears, spongy metal, difficult core removal, etc. Considerable trouble of this nature was encountered until a change in the method of heating was undertaken.

In the core department, the baking ovens are in two divisions: high-temperature baking ovens and pasting ovens, where cores are joined in forming large multiple cores for final usage. The stationary high-temperature ovens are made of brick and are 12 ft. wide, 9 ft. high and

18 ft. deep. These ovens had been fired with oil under the floor, the heat passing into the oven through two ports located at the bottom of the front end of the walls. The oven gases were removed at the center of the bottom of the back wall, through a port leading to a 50-ft. stack. This method of heating had many disadvantages.

After conversion to gas the suction-tee premixing system is now utilized, with a 3-in. mixture manifold extending along the bottom of each side of the oven. Each manifold contains 50 lava blast tips of special design for natural gas, uniformly spaced to equalize the heat throughout the oven. Flames from the tips, all arranged to fire horizontally across the bottom of the oven, are visible in the picture.

With the trucks forming a series of baffles, firing across the bottom gives exceptionally uniform heat distribution. A rectangular sheet-iron vent pipe, 12 in. wide and 3 in. high for maximum headroom, is run along the center of the roof into the stack. Four slots varying from 4 x 4 in. at the front end to 1 x 4 in. at the stack end are uniformly distributed along this vent pipe, for equalization of gas removal. The maximum capacity of each manifold is 800 cu. ft. of natural gas an hour. The tips produce very short, sharp flames of high velocity, with a manifold pressure of about 5 in. of water.

The continuous core and pasting ovens are divided into two compartments, each about 10 ft. wide, 9 ft. high and 40 ft. long. A monorail system handles the continuously traveling trucks of cores that pass through the ovens. After conversion to gas firing, these ovens were utilized also for drying the ladle stoppers, as shown at the right side. These ovens also had been fired with oil under the floor, where a series of openings along the center permitted the hot gases to enter the chambers. The waste gases were removed through a long flue located along the center of the top of the ovens, with adjustable slots for heat control.

The same method of conversion to gas firing was applied here, except that a single manifold is utilized for each oven, placed along the bottom of the inside wall, the tips also firing horizontally under the trucks.

Electric lift trucks are used for transportation of the trucks of cores and for charging the stationary ovens.

Before the complete gasification of these ovens, thorough tests were applied to a pair of ovens, one of which was equipped with the original oil system, with an adjacent oven converted to the new method of firing with gas.

Tests of Two Fuels for Ovens

The first tests were run for uniformity of temperature throughout the oven. As in the sketch, each oven has a capacity of twelve trucks, numbered as shown. The bulbs of two recording thermometers were fastened to certain trucks placed at specified positions, top and bottom, back and front, or two sides, for simultaneous comparison. These tests were run during regular operation, no delay in production being permitted. Only two points could be compared at once, due to methods of charging, resulting in temperature variations should the door be opened or the operation necessitate changes. The same method was applied to both ovens.

SUMMARY OF TESTS

Oil-Fired Oven:		Temperatures, Deg. Fahr.		
1. Opposite sides of oven:				
Truck positions, 7 and 9	Thermometers tied to fourth rack of truck.	Left, 650	Right, 650	Diff. 0
2. Back and front of oven:				
Truck positions, 2 and 11	Thermometers tied to fourth rack of truck.	Back, 580	Front, 760	Diff. 180
3. Top and bottom of oven:				
Truck position, 5....	Bottom and ninth rack of truck.	Top, 690	Bottom, 520	Diff. 170

GAS-FIRED
Stationary
Core Oven,
Showing Entry
of Heat from
Manifolds Along
Floor at Left
and Right



4. Top and bottom of oven:
Truck position, 9..... Top, 695 Bottom, 450 Diff. 245
Bottom and ninth rack
of truck.
- Gas-Fired Oven:
1. Opposite sides of oven:
Truck positions, 10
and 12..... Left, 420 Right, 425 Diff. 5
Thermometers on bot-
tom rack, to check
excessive heat from
burner tips.
2. Back and front of oven:
Truck positions, 2 and
11..... Back, 520 Front, 510 Diff. 10
Thermometers tied to
fourth rack.
3. Top and bottom of oven:
Truck position, 5..... Top, 560 Bottom, 560 Diff. 0
Bottom and ninth rack
of truck.

During the tests, for a period of about a week, fuel meters were placed on each oven, one oil and the other gas, and daily readings were taken. The average daily

consumptions, on identical operation for both ovens, were as follows:

Oil, about 30 deg. Bé, 267 gal. in 24 hr.;
Gas, about 1100 B.t.u. per cu. ft., 19,810 cu. ft. in 24 hr.

The numbers of trucks removed from each oven completely baked in one test period were:

Oil-fired oven, 29 trucks;
Gas-fired oven, 43 trucks.

This inequality of production was due to two major causes:

1. Twelve trucks could be charged into the gas-fired oven, while only ten could be placed in the oil oven because of excessive heat at the ports of the oil oven. This is indicated as positions 10 and 12.
2. The inequality in temperature distribution in the

GAS-FIRED
Continuous
Core Ovens,
Showing Meth-
od of Running
Cores Through.
Stoppers may be
seen drying,
along the wall



oil oven necessitated removal of top, completely baked cores from trucks, which had then to be returned for the completion of baking of the green, bottom cores. This was standard operation on the oil-fired ovens.

During this 9-hr. test period, all cores were counted and weighed, great care being taken to avoid duplication or possible error in count. All trucks were marked and, when unloaded after baking, marks were removed. Both ovens were up to temperature when tests were started and filled simultaneously with fresh loads. At the end of the test period all trucks were removed, the cores being thoroughly baked. Only completely baked and finished cores were counted, those returned for completion not being included.

Actual net production of good cores in 9 hr. was:

Oil-fired oven, 9,102 lb.

Gas-fired oven, 11,713 lb.

Gain in production in gas-fired oven was 2611 lb., or 28.7 per cent.

Based upon the fuel consumption of both ovens during

the test period, and upon fuel prices prevailing at the plant, the fuel costs per net pound of cores produced indicated:

Oil-fired oven, 0.112c.

Gas-fired oven, 0.047c.

Saving in fuel costs, 0.065c., or 58 per cent.

Upon this basis, the total annual production of cores in all the company's ovens would represent a saving in fuel costs of over \$10,000 a year. In addition, many intangible savings could be included, such as lower oven maintenance, for with oil firing the ovens required complete reflooring and wall patching, due to high temperature in combustion chambers, about twice a year. No excessive temperatures were encountered with gas firing. Core production was increased without adding more ovens, which had been contemplated with oil firing. Working conditions were greatly improved, particularly in handling of trucks in the oven and in control of temperatures.

Subsequent operation of the completely converted plant showed even better savings than those indicated on the tests.

Physical and Chemical Characteristics of Slags Being Studied

SLAG in open-hearth furnaces is composed of the various oxides resulting from the elimination of the impurities manganese, phosphorus and silicon in the charge, sulphides resulting from the elimination of sulphur, usually present in relatively small amounts, iron oxide added or formed during the process, oxides such as lime which are added with the charge in order to flux the above-mentioned products of oxidation, and lime and magnesia resulting from the scorification of the furnace lining.

There are three primary reasons why slags are present in the process of steel manufacture:

1.—The elimination of the impurities mentioned above forms a slag, so that whether the steel-maker desires it or not a slag is always formed. By the addition of proper oxide fluxes, these impurities are held in the slag, and for a given type of slag the impurities may be eliminated to the degree desired in the steel product.

2.—If there were no slag, the metal would be continuously oxidized by the furnace gases. On the other hand, a certain amount of oxidation is necessary to eliminate carbon and various impurities. One of the main functions of the slag is, therefore, to prevent direct oxidation of the metal and to control the rate at which the metal is oxidized. This is very important, since the rate at which the metal is oxidized may very often be the primary factor in determining the quality of the product.

3.—The slag acts as a medium for scrubbing out non-metallic matter from the metal. This is generally termed "cleaning up the heat" by the practical operator. In order to clean up the heat properly the slag must have physical properties such as proper surface tension and proper viscosity.

The chemical analysis of the metal during refining is controlled by the chemical and physical characteristics of the slag, by the amounts of impurities introduced in the charge and by the temperature of the bath. The cleanliness of the metal (with respect to the non-metallic matter suspended therein) is controlled more by the physical than the chemical properties of the slag. Data on two important physical properties of slags, viscosity and surface tension, are almost entirely lacking.

Steel-making slags may be generally divided into two groups—oxidizing and non-oxidizing slags. In the present-day methods of open-hearth steel operation there are no non-oxidizing slags, these slags being confined to electric furnace operation, where the slag is deoxidized with carbon and calcium carbide is always present. Although the development of the manufacture of steel has taken

tremendous steps in the past 40 years, very little has been done in the way of improving the quality of the slag, and the slags of the present day are very much of the same type as the slags of 40 years ago. The primary reason for this is that very little research has been done on slags other than those used in regular day-to-day operation. Obviously, an operator will make no radical changes in practice unless he has definite information on which to make the change. A study of the physical and chemical properties of various types of slags is therefore of fundamental importance.

A great deal of splendid work has been done by the geophysical laboratory of the Carnegie Institution of Washington on slag systems, and the steel industry has profited greatly through this work, which was not done with steel plant operation in mind. Researches on the physical and chemical characteristics of slags are being conducted at the Pittsburgh experiment station of the United States Bureau of Mines, in cooperation with the Carnegie Institute of Technology and the Metallurgical Advisory Board, as well as at other institutions. There is still, however, a tremendous field to be covered before the possibilities or limitations of various types of slags will be known.

Removal of Powdered-Coal Ash as Slag

A cooperative arrangement for the study of the removal of ash as molten slag from powdered-coal furnaces has been entered into by the United States Bureau of Mines, Department of Commerce, and a special research committee of the American Society of Mechanical Engineers. This subject is important because of the serious problem of the disposition of the ash from high-ash coals burned in pulverized form.

If the ash can be run off in a molten condition the problem would be greatly simplified. The investigation is intended to obtain data on the factors which influence the formation of fluid slag in furnaces, the means by which fluidity may be measured, and the proportion of total ash in coal which remains in the furnace.

Laboratory work in connection with the investigation will be done at the Pittsburgh Experiment Station of the Bureau of Mines, while operating tests will be conducted at plants designated by the American Society of Mechanical Engineers.

Materials Handling in Assembly

Considerations Governing Choice of Type of Equipment to Be Used—Keeping Inventory and Floating Stocks to a Minimum

CONTROL of the flow of materials through the factory is one of the biggest and most important functions of management.* It is not the purpose to set forth in detail any particular methods of controlling and handling material, but rather to make a general discussion of the problems involved.

The primary function of any material control and handling system used in assembly work is to provide the necessary parts at the proper time and place. Before the details of the control and handling problem can be worked out it is necessary to decide upon a plan of scheduling. Any plan which contemplates volume handling without excessive inventory must be efficient and flexible.

Avoid Passing Parts Through Stockroom

Most modern plants have long since discarded the older method of feeding the finished parts into a stockroom and from there to the assembly lines. Present practice is to have the finished part feed directly from the machine line or subassembly line to the point where it is assembled to the larger unit, with as small a float (a) as is consistent with the nature of the part and the method of fabrication. This latter method of fabrication requires that considerable thought be given to the layout of the plant.

At the Oakland plant a sales forecast, which is released 90 days in advance, is the basis for our major manufacturing schedule. From this major schedule monthly manufacturing schedules are made up for the larger units of the car, such as motors, transmissions, axles, bodies, etc. These monthly schedules also include the items furnished other General Motors units. The next step in the plan is the daily schedule. A daily schedule is necessary for the following reasons:

1. Variation in models and equipment requested by the sales department.
2. Deviation from the schedule of bodies from the Fisher plants.
3. Unavoidable factory holdups of parts peculiar to certain models.

This plan of scheduling is flexible enough to allow uninterrupted production under any but the most unfavorable conditions. With the proper schedule available, the materials handling system resolves itself into the problem of supplying the materials in the necessary quantities, at the proper times and places, with the least expense and smallest possible inventory.

Possible Reductions in Inventory

The question of inventory has long been a sore spot in industry. It is our belief that, although our investment in working capital tied up in work in process is 20 or 30 per cent lower than it was a few years ago, it may still be reduced considerably by the further application of what we have learned about material control and handling in the last few years. We have been able to reduce our inventory to a fairly satisfactory figure by storing mate-

rial in bays along the assembly lines, as near as possible to the point where it is to be used. This eliminates necessity of double handling as well as necessity for keeping a stock record in the factory.

It is our practice to operate with a three and six-day bank of material. This requires a close follow-up of over 7000 different parts and a high degree of cooperation between the material planning department, purchasing department and traffic department, to assure a three-days' supply of material on hand, and if a part is placed on shortage to see that it is given the preference in transit as well as when received at the plant.

Cost Not Only Reason to Avoid Stocking

Proper scheduling of such items, as bare, enameled, painted and plated sheet-metal parts is a vital item from the standpoint not only of money tied up, but also of losses due to the digs and scratches always to be contended with wherever these parts are stored.

When the questions of schedules and inventories have been settled, the problem has narrowed down to the actual receiving and handling of the materials in the plant.

Subassemblies are made up as close to the point of use as practicable. This is done because, in most cases, it is easier to truck and stock the individual parts than it is to truck and stock the completed subassembly.

At the new Oakland plant all unloading, except bulk foundry supplies, is done under cover. Fifteen railroad tracks which enter the plant connect directly with a main line just outside the property line. Six of these are for unloading material; one is for receiving lumber and shipping export cases and the rest are for shipping domestic cars to dealers. An electric line spur and a number of truck docks are used for receiving materials. Approximately 80 carloads of material a day are received, and in addition many truck and trailer loads. This amounts to a total of about 50,000 tons a month.

How Various Parts Are Handled

Frames are unloaded from the box cars and trucked to the lines. Surplus frames are placed in an especially designed building by means of a crane that stacks 10 frames at a time in storage.

Electric and gasoline lift trucks are used, almost exclusively, in taking material from the docks to the proper place along the assembly lines and from one department to another. Several types and sizes of skips are employed. The ordinary flat skip is used for cartons and kegs, and for parts that can be piled without danger of slipping. Box skips, full of small parts that cannot be placed on the flat skips, are transferred by means of a crane. A few tractors are used for special handling of bulky parts.

Special trucks are used wherever possible, not only to facilitate handling, but also to prevent damage in transit.

Layout Important for Efficiency

To get the maximum efficiency out of lift trucks or tractors the layout of aisles must be carefully considered. It is necessary to have the aisles of sufficient width and the turns and corners of great enough radius so that there will be no lost time. Ample headroom is also an im-

*From paper by Gordon Le Febvre, read at Detroit May 3, before the American Society of Mechanical Engineers.

(a) Floating supply between point of production and point of utilization.

portant factor, as is the absence of any steep grades.

Conveyors of one sort or another have been in use for a number of years, but in recent years they have been applied more freely and intelligently to production problems. Many different kinds and styles of conveyors are used. The question of which type of conveyor to use is arrived at only after thorough investigation of each case.

Two Main Groups of Conveyors

Conveyors may be divided into two major classes, i. e., those whose only function is to move material from one

place to another and those whose function is to move work progressively from one work station to another. The first class is in all cases independent of human effort. The second class may be in either constant or intermittent motion, or the work may be manually moved by the workman.

The constantly moving conveyor is most often used on progressive assembly work, where its desirability as a pace-setter cannot be denied. On certain kinds of inspection work and such work as body striping it may be desirable to have the work pushed along by the workman.

How Mass Production Came Into Being

Development of the "Automotive Method" from Previous Ideas Was Gradual

—Each Car Was Formerly Built in One Spot

DISCUSSING in Detroit, early in May, the application of motor car manufacturing methods to other industries, C. W. Avery, president, Murray Body Corporation, Detroit, prefaced his description of the Ford Motor Co. method of making plate glass with a survey of the development of what we now know as "mass production," with special reference to manufacturing on moving conveyors. In introducing Mr. Avery, the chairman of the meeting (American Society of Mechanical Engineers) before which he spoke referred to him as the originator of that method of manufacture. He was formerly general superintendent of the Ford Motor Co. What follows is taken from his introductory remarks.

Began with Pre-existing Methods

In the early stages of motor car manufacturing, the design of the product was of supreme importance. Established methods of manufacturing at that date could satisfactorily take care of the required production.

The larger machine shops were laid out according to the kind of machine being used. There was a snagging department, a drilling department, lathe department, milling machine department, etc. Stock was routed through these departments according to the operations required, often landing in a stockroom between operations.

Foundries that produced automobile castings were the same as foundries producing all other castings. The molds were made and placed in a stationary position on the floor, and the molten metal then distributed among them.

Assembly departments were laid out much the same as a shipyard. Each automobile assumed its final proportions in the original location, all kinds of stock and minor assemblies being transported to that location.

Increasing Demand Forced Changes

As a result of these methods a great deal of stock was required between operations and in the stockroom, resulting in heavy inventories and high cost of moving materials. As the demand for motor cars increased, it became necessary, to meet that demand, to develop methods that would reduce both the capital requirements and the cost of manufacturing. The development of improved methods has been a process of evolution, each year bringing forth something new as a result of the experience gained in the previous years.

As the industry grew, mechanics and foremen became more versatile. In a machine shop it was found possible to place machines of different kinds in the same department, resulting in close proximity of consecutive operations. Even heat-treating furnaces were placed in the midst of machines, to avoid the long haul between operations to a heat-treating department.

Continuous methods were adopted in the foundries, where the molds were made at one point and moved by conveyors to a convenient place for pouring hot metal, and thence to the location where the castings were finally removed.

In the early stages of assembly, one gang was trained to assemble the car completely in its original location. Later the operations were split so that a gang doing a certain operation moved from one location to the next, continuing on the same operation throughout the day. The increased demand and resultant greater production made it possible and necessary to split these operations more and more—necessary because of the [inadequate] amount of skilled help available.

Assembling in a Line Moving Intermittently

Later the method of assembling on a conveyor was proposed. This method consisted in keeping the operations approximately at a fixed point and moving the work to and past these operations by mechanical means. It was my good fortune to have the problem of developing the first continuous automobile assembly line. This development came through a process of rather rapid evolution.

The first continuous assembly line had no mechanical means of movement. The wheels of the car were assembled at a very early stage and channel iron tracks provided for them. At intervals, giving sufficient time for the operations to be performed, the foreman blew a whistle and all hands pushed the cars forward to the next position, and then returned to their original locations to perform their next operations.

Using Mechanical Conveyors

In the next stage we provided rigid spacers between the cars, and introduced a pusher chain about three cars long at the beginning of the line. This worked well for a few weeks. The cumulative resistance, however, was too close to the safety factor. One day the complete line buckled and pushed a section from the side wall of the building. It was then that the continuous chain was introduced.

Mechanical conveyors have played a very important part in the evolution of motor car manufacturing methods. They have been used not only in the assembly department, but for distributing and collecting materials in other manufacturing departments. Belt conveyors have proved satisfactory for the collection of material from a line of machines and delivering it to a given point. For the distribution of material, however, the continuous overhead return-chain conveyor has proved most satisfactory, due to its flexibility.

Function of Steel Plant Metallurgy

Quality Standards Needed—Regulation of Grain Size
Essential—More Contacts with the Trade Practised
—Tests Now Emphasized

BY R. E. SHERLOCK

WHILE the quality of the present day automotive steels greatly surpasses that of yesterday, the steel manufacturers are keenly alive to the fact that present-day standards must advance to meet higher standards of tomorrow. Their desires to improve their products, to advance in quality production, are no less ardent than are those of the immediate consumers in perfecting the manufacture and performance of finished parts.

Definite Standards on Quality Necessary

To manufacture quality steels, a mill must adopt some definite standards on quality. Once set up, comparisons are made regularly and knowledge is gained as to whether or not actual improvement is being made. Cleanliness and soundness (aside from chemical analysis) are the fundamental principles of steel quality and such features as controlled grain size, freedom from fiber, etc., are classified more in the nature of refinements.

A good practical method of recording the fundamentals of quality steel is by the merit number system which may or may not refer to micrographs or macrographs. This system of recording the cleanliness or soundness of a heat of steel by giving it a number rating is much superior to simply classifying it as "fair" or "good," etc., as it gives a numerical basis to work to or to make comparisons with, as well as the advantage of plotting graphs. From such data certain classes of steel are studied with the idea of identifying the type of impurity or defect predominating and of locating faulty practice in the manufacture.

Only a short time ago, in speaking of grain size, normality, or other phases, a melter would be more or less disconcerted, not knowing what was being referred to. This is not true today, as heats are made to specifications including a wealth of detail other than chemical analysis, and great interest and concern is shown by the men on the floor in the making of heats, the specifications of which call for the more exacting refinements. The metallurgical division must drive home the quality standards to the open-hearth and electric furnace men.

Rates of heating and cooling of steel and the rolling temperatures are checked regularly even after standard practices are adopted. We are all

The accompanying article is an abstract of a paper read May 24 before the American Iron and Steel Institute, at New York, together with the discussion which followed.

aware that the best rolling temperature from a production standpoint in the mill is not always the best rolling temperature from a metallurgical standpoint. Many customers wish to machine hot-rolled steel at a high speed, to fabricate it cold by punching or bending, without being burdened with the expense of annealing, and their ability to do so often depends upon the microstructure as well as the hardness. In other cases, to obtain certain response in annealing or heat treating, it is desirable to start out with a fairly definite grain structure in the hot-rolled steel. It therefore often follows that the rolling temperatures must be controlled to obtain a microstructure basically correct for subsequent operations.

It is likewise true that the cooling of steel after rolling is quite important. In some cases, rapid cooling is desirable, particularly for machining purposes. Usually, however, slow cooling is of much greater importance; in fact, it is necessary in certain sensitive alloy steels to prevent internal strains and ruptures and, in others, to obtain sufficient softness for cold shearing or cold working.

The cold shearing properties of steel are assuming an ever increasing importance. On account of their chemical composition, many of the alloy steels rolled today, such as the higher carbon grades of the S. A. E. 6100, 5100, 4100 and 3200 series, are slightly self-hardening. This natural hardness is dependent further on the size, the finishing rolling temperature and the rate of cooling. A concrete example is chrome-molybdenum steel over 0.40 per cent carbon. Cold shearing is, as a rule, safely accomplished on rounds under 1 in. and on squares under 1½ in. On sizes slightly larger, the cold shearing properties are doubtful, while on still larger sizes, cold shearing is practically impossible. While affected by the grain size and the existence of strains, the ability to cold shear such steels depends on their hardness.

While such steels can be annealed so as to cold shear satisfactorily, difficulty is met in obtaining the necessary extra to cover the annealing costs. Consequently, the mills are doing everything possible to effect slow cooling after rolling in order to avoid the necessity of this annealing, but this impedes production and increases costs for handling. Another factor which lies entirely in the customer's hands is the temperature of the steel during cold shearing. It should not be necessary to state that it is very



SINCE graduation from Cornell University in 1914, R. E. Sherlock has been identified with the steel industry. For nine years he was associated with the United Alloy Steel Corporation, at Canton, Ohio, and in 1923 he assumed his present position, which is that of metallurgical engineer of the Donner Steel Co., Inc., Buffalo, N. Y.

poor practice to cold shear billets, which have been exposed to the winter weather for a few weeks, without first taking the chill out of them, yet this is done a great deal and cracking results. While a plant may not have facilities for warming such billets to room temperature, it is hardly fair that the mills should be held in criticism for all such difficulties.

Many Experimental Investigations Active

Under the supervision of the plant metallurgists, there are constantly being put through innumerable experimental investigations. Practically 95 per cent of these are with two definite objects in view:

(1) Improvement in the inherent quality of the furnace product, and (2) improvement in the surface condition so as to reduce chipping costs.

The first involves principally the inspection of various kinds of raw materials, the physical chemistry of slags, melting conditions, temperatures, and the use of various kinds and amounts of deoxidizers. The second involves the exploration of that vast field which has a bearing on surface, such as runner spouts, nozzles, stopper rods, pouring temperatures, pouring methods, moulds, mould washes, hot tops, ingot heating and soaking, amount of draft in the blooming mills, method of rolling, cooling, and many other details.

Commercial and Select Forging Steels Defined

Two classes of carbon steel are commonly produced today, commercial steels and select forging steels. There seems to be considerable misunderstanding in respect to these steels. This misunderstanding may be largely due to the steel mills themselves, but certain lines of definition should be laid out for the differentiation of these two classes.

Commercial steel is the product of an ingot which has been cropped only to the extent of removing the visible pipe and rolled from unchipped billets (or chipped only to the extent of removing bad tears and similar defects). Select forging steel, on the other hand, is the product of an ingot which has been more amply cropped and rolled from chipped billets which, in most cases, have been previously pickled. It, therefore, follows that the commercial steel, having the lesser discard, will on the average vary more in chemical composition than will select forging steel. Commercial steel varies more in composition than does select forging steel and its application on parts calling for rigid chemical limits, or uniform physical results after heat treatment, is attendant with risk.

Surface of Bars Depends on Surface of Billets

It is likewise a fact that the surface of the bars is directly dependent upon the surface of the billets. As commercial steel bars are rolled from unchipped or lightly chipped billets, they are subject to some surface defects. On the other hand, the select forging bars are rolled from chipped billets which, in many cases, have been previously pickled and such bars on the average have a much superior surface. This grade of steel cannot be guaranteed by the manufacturer for forging purposes, as the surface is an uncertain factor although it is kept within reasonable limits.

There are many cases where it can be used for forgings, particularly those of simple design or relatively unimportant parts, but whether or not such a steel is to be used for forgings at all is a question for the user to decide and at his own risk. It is not at all unusual to find a consumer who has used commercial steel (at a saving in price over select forging steel) for forging purposes, and, after having had good success with possibly three or four heats, encounters fairly large rejections on a fifth heat, on which he promptly enters a bitter complaint to the effect that the steel has not been up to past standards. This is an entirely erroneous attitude.

With select forging steel, it is obvious that, on account of the loss sustained by the extra discard and for the cost of pickling and chipping the billets, the selling price is higher than that of the commercial steel. Chemically and physically it is a better steel, and it is a cheaper and far more satisfactory product for the forging trade.

Hardness and Fiber Testing Extensive

Determination of physical properties is routine laboratory work and while it is carried on primarily for approving specific heats or rollings for application on orders specifying definite properties, it is also carried on for the compilation of data to be used as standards and for the bases of future recommendations. In this work we find that the tensile and Brinell hardness tests are of first importance. While few specifications call for transverse tensile testing, there is a certain amount being done, as it has been found that the ductility determinations are a very good indication of the quality of the steel.

The testing of steel for fiber is quite extensive. There are two general types of fiber, that associated with low-carbon steel, often referred to as woody, shelly or laminated, which is observed after carburizing, heat treating and fracturing the test piece longitudinally, and that observed in higher carbon grades, referred to as reedy or woody, after normalizing or quenching, drawing to a sorbitic condition, and fracturing transversely. Fiber exists in all steels, but for certain parts it is considered detrimental and it is highly desirable to keep it at a minimum.

The chief merit in ordinary transverse fracture tests is the detection of pipe or interior flaws or flakes, and the observance of grain refinement. An examination of a longitudinal fracture is often a very good check for non-metallic impurities.

Microscopic Work Must Be Intelligent

If used by an intelligent studious observer, the microscope is an invaluable instrument in the laboratory; if carelessly used, very misleading and erroneous conclusions are frequently arrived at. To examine for cleanliness, 100 magnifications is generally used. For comparative purposes, a merit number basis is undoubtedly the best way to record a heat or lot in this respect. Some laboratories base acceptance or rejection on the worst area of the worst section examined. We feel that this is wrong.

Grain Size Must Be Regulated

In routine work, there is less total work done on microstructure than there is on impurities. Microstructure is most necessary, however, in checking shipments for machining purposes, as grain size has an important bearing on this. As a specific structure for good machining at one plant may be essentially different from that at another, it is well to have on hand individual samples and micrographs in order that comparisons be made and, from such standards, rolling temperatures and annealing treatments can be prescribed. As a usual thing, to get good machining properties in unannealed material, it is advisable to roll a steel hot, which gives a large and more brittle grain, whereas, if the material is rolled cold, a small tough grain is obtained and this usually causes tough machining. The microstructure is also very important with certain grades, particularly the high-carbon chrome steels, which must be annealed, cold worked and heat treated; in such cases, the small grain produced by rolling cold is most desirable.

At the present time, an immense amount of work is being done throughout the country on grain size, as observed after the McQuaid-Ehn test. On low-carbon steels many plants now have size charts which are used as standards and have specified a certain range for this material. The control of grain size has been an exceed-

ingly difficult problem for the mills and research work on this phase is going on at a high rate in this respect.

Mass production in the automobile industry has demanded that there be no holdup on account of faulty or improperly conditioned steel. To guard against this and to put into service better and more rugged parts and units, their respective metallurgical and inspection departments have had much greater responsibilities thrown upon them. These departments have increased in size, have given their raw material a much more thorough inspection in regard to details, and have devoted a great length of time in studying particular phases in respect to production and uniformity of quality.

Irrespective of this, the stage has arrived when certain customers demand particular characteristics in the steel, and failure to comply with these demands means rejection, although the terms of the written specifications, or order, have been fully complied with.

The business of the field representatives of the metallurgical department, assisted by various operating representatives, is to keep in close personal contact with the metallurgical, operating, inspection and development departments of their customers and prospective customers. In a large number of plants, it is imperative that, before orders may be solicited, a steel source must be placed on an approved list in so far as quality is concerned. The mill must give a reasonable demonstration and guarantee that their product will pass the requirements. This can only be accomplished by preliminary work between the two metallurgical departments, and, consequently, it is a vast help to the selling organization to get under way. However, once established, there can be no let-up on contact work.

Confidence Due to Contact

One outstanding feature of contact work is the confidence gained by the user for his sources. For example, there are numerous alloy steels made to rather narrow chemical limits and even under the most careful melting the mill will make an occasional off-grade heat. Obviously the heat is rejected by the mill if one or more elements fall very far outside the specified range, but should the chemistry fall outside the limits only slightly, it frequently receives the approval of the customer by telling him beforehand the exact analysis and various checks and asking his permission to apply it. If not carried to excess, this cooperative procedure is of direct benefit to both.

The activities of the field representatives carry into all kinds of manufacturing plants and consequently their experience is broad and their opinions sound and well

worthy of attention. Their advice and recommendations are given gratis and they have saved customers many thousands of dollars.

Plea For Research Sponsored By Industry

THE kind of plant metallurgist required to fulfill the functions described by Mr. Sherlock would require an almost impossible paragon, in the opinion of H. W. Graham, chief metallurgist, Jones & Laughlin Steel Corporation, Pittsburgh. After considering the various duties which fall on his shoulders, Mr. Graham said that the real plant metallurgist is a newcomer into the operating staff; his principal duty is to perceive the trends of future developments in consumers' requirements, and to advise the management on the necessary steps to take in order to produce material to meet the demands. He should therefore be in close touch with the customers, a mine of information, and primarily a "debunker," with a keen sense of the relative value to place on various factors of the daily problems.

O. L. Pringle, assistant general superintendent, Pittsburgh Crucible Steel Co., Midland, Pa., pointed out that such plant metallurgical departments as do exist are frequently given niggardly appropriations in comparison with the amounts of money necessarily spent by the operation departments in maintaining the standards set up by them. Steel makers are finding it more and more difficult to satisfy the demands of the trade in quality lines, because the expansion of the uses of fine steels have so greatly increased the diversity of the requirements, the competition among producers is becoming keener, and finally because the consumers frequently employ more and better metallurgical talent than the steel makers. However, the managers of the steel industry must meet the issue. Alloy steel tonnage alone now approximates the output at the whole industry 40 years ago, to say nothing of the large amount of "special quality" steel made without alloys.

In Mr. Pringle's opinion the only way the vague and inconsistent requirements of many specifications can be successfully met, is for the producers to secure precise information on what these new tests mean, whether they should be standardized or merely ascribed to personal whim of the purchaser. He concluded with a strong plea that the American Iron and Steel Institute join in cooperative research into fundamentals of steel production—a plan which has been proposed in the past, and which has been actually undertaken by the British Institute—to get the necessary facts more needed today than ever before.

Can Molding Sand Be Improved?

PREVENTION of cracks in steel castings is discussed by Carl Singer in a recent issue of *Die Giesserei*. He believes it is frequently possible to control this trouble by controlling the rate of solidification of the steel in the molds.

Among the methods recommended are: an increased temperature of the molten metal, heated molds, and molding materials which are poor conductors of heat. Probably greatest success would be attained by a combination of all these methods. If steel insufficiently heated is not deoxidized thoroughly it holds an excess of gas which ultimately increases the risk of cracks. It is therefore of importance to keep the steel fluid in the mold as long as possible, and from this point of view it is useful to heat the molds, provided that the heat does not vitrify the sand and create difficulties in shaking out and cleaning the casting.

Use of kieselguhr or other poor conductors of heat in the molds is well worthy of consideration, provided the material adopted is refractory, plastic, compressible and porous. Kieselguhr is really too porous, as the air which it contains would cause bubbles in the metal. A layer of facing sand corrects this difficulty. Or a mixture of sand and asbestos waste might be used, which, besides decreasing the heat conductivity, would increase the compressive strength.

It is certain that the discovery of an efficient substitute for molding sand would be a very important aid in making those castings which, by their shape, have an inherent tendency to crack during solidification. These could then be cast from very hot metal, well deoxidized, and as free as possible from the gases which contribute so largely to the creation of blowholes and other common defects.

Insulation and Refractories in Furnaces

Importance in Their Design—Modern Industrial Furnaces Are
Now Machines—Proper Cements Used More and More

BY GUY A. BARKER*

ECONOMIES which have resulted from the use of heat insulation, its effect on refractories used in furnace construction, and the resultant changes that may be anticipated in furnace performance, have aroused new interest among furnace designers and users, especially in view of the improvements that are being brought about in the manufacture of high-grade refractories and accessory materials.

With improvements in refractories during the last quarter century, furnace walls have been made thinner and thinner. Steel has been developed for structural support to replace piles of masonry, suspended arches have come into vogue, firing and heating methods have been improved, and definite principles of design have been brought into play in connection with combustion chambers and heat transference. Recently, the use of alloys for conveyor, belts, guide rails, etc., together with mechanical pushers, feeders, carriers and dischargers, have tended to put modern industrial furnaces in the class of machines.

Function of Insulation

GROWTH and development of insulation suitable for use on furnaces have been coincident with that of the refractories in connection with which it is used. The necessity for materials, designed to retard flow of heat, arose as a corollary to the use of thinner walls of better grade brick as well as increasing demands for higher efficiencies.

The fact that it is far more preferable to minimize design to retard heat flow arose as a corollary to the use of thinner walls of better grade brick as well as increasing demands for higher efficiencies. The fact that it is far more preferable to minimize heat losses by the use of insulation rather than by using very thick walls is emphasized by this illustration: An 18-in. firebrick wall insulated with a 4-in. thickness of high-grade insulation will transmit less heat than a solid refractory wall 60 in. thick.

Insulation Limits Heat Flow

The first reason why insulation should be used is accounted for by the desirability of limiting heat flow from the hot interior of the furnace, in order to reduce the fuel expenditure necessary to maintain the furnace temperature. Raw fuel has steadily increased in price during recent years, and modern construction has eliminated the great thickness of brick that formerly tended to cut down heat loss. Both of these factors point directly toward the use of an efficient material to bar the flow of heat from the inside of walls and arches. When it is considered that the heat loss from one square foot of bare surface often amounts to a matter of dollars per year, the proper emphasis begins to be laid on insulation which will save a major portion of this loss.

Heat that is retained in the walls by virtue of the insulation works to raise the mean temperature of the refractories. This minimizes the temperature differential

between the inside and outside of the brick which lessens internal strains and reduces spalling effects. Akin to this are the fewer and smaller wall cracks that appear, due to uneven expansion and contraction.

Insulation itself, if properly applied, tends to seal cracks in furnace walls, thereby operating to prevent the infiltration of air or the extrusion of furnace gases. In some applications this feature is of even more importance than the saving of heat and reduction in fuel cost.

It is usually true that the capacity and efficiency of a furnace or boiler are directly dependent upon the operating temperature. With the improvements that have taken place in refractories, and the protection against internal stresses afforded to the brickwork by insulation, we find a recurrence of efforts to carry on various processes at higher and higher temperatures. Here again we are limited by the heat-resisting properties of the refractories that are available, but the tendency seems to be in the direction indicated.

Function of Refractory Cements

A DISCUSSION of means and methods for protecting and extending the life of refractories would be incomplete without some mention of improvements that have been made in the last 20 years on the bonding of brick. During this period refractory cements were originated, developed, tried and proved to be of great importance in reducing maintenance of refractories.

New Brick Bonding Materials Developed

In the best furnace practice a material is needed to bond the bricks as well as take up irregularities of shape. Fireclay is merely a filler and does not have bonding strength or high temperature resistance. It shrinks badly, crumbles away and blows out of the joints, exposing the edges of the bricks to the action of flame and ash. The evil effects of this exposure are apparent to anyone who has looked inside a furnace setting.

By the use of a suitable refractory cement, several notable advantages are brought about. Heat losses are cut down by eliminating the open joints between the bricks. This further assists in protecting the insulation from furnace gases or vapors. Air which might otherwise be drawn in through the walls is excluded by the tight setting which results from the application of a strong cement.

The erosive action of oil flames and the slagging of brick by low fusion ash are items of great concern. A setting with tightly sealed joints of strong refractory cement and brick pores filled by wash coating is the best protection that it is possible to obtain. Where refractories are spalling or melting away, the deterioration may be slowed down considerably by a $\frac{1}{4}$ to $\frac{1}{2}$ -in. plaster coating of the proper refractory cement bonded directly to the interior of the setting. Walls whose life could be measured by weeks have thus been made to last months.

If the brickwork has failed locally, instead of replacing the destroyed brick, it is frequently economical to make a hole in the setting and pound in suitable plastic firebrick material. Pit fires, small ladles, certain induction furnaces and similar equipment are usefully served with

*Mr. Barker, whose paper before the Western Metal Congress of the American Society for Steel Treating at Los Angeles is here reviewed, is manager industrial department, Pacific Division Johns-Manville, Inc., San Francisco.

rammed-in monolithic linings of a proper refractory cement.

Firebrick of Alumino-Siliceous Clays Important

Firebrick made from alumino-siliceous clays are predominant in manufacture and use. Their relative cheapness makes them common even when their acid character is disadvantageous. Such bricks are strong and resist temperature changes well, but are subject to shrinkage under some high temperature furnace conditions.

Probably the most important basic brick is magnesite. Commercial magnesite bricks are suitable for furnace linings up to temperatures of 2900 deg. Fahr. This product has important use in the lining of basic open-hearth furnaces for copper and steel.

The carbides and high-grade alumina which have shown such remarkable refractory properties are con-

stantly gaining in favor where special uses can profit by their peculiar characteristics. A suitable cement should have a base similar to the brick used in the setting, and should be chemically inert to the action of the furnace.

It should have a temperature resistance equal to or better than that required of the brick, and should bond firmly without undue shrinkage. The cement should be readily workable and ordinarily should not vitrify until exposed to furnace heat, in order to allow for the readjustment that takes place in setting during the initial firing.

All of the co-relating properties of insulation, of refractory cements and of refractories themselves, when taken to advantage in the most approved manner, operate to place at the disposal of the modern user of industrial furnaces a production which, as to quantity, quality and economy, was literally unheard of prior to the last decade.

Medium-Manganese Steel for Largest Arch

New Alloy for Main Members of Kill van Kull Bridge, New York—Look for No Special Fabrication Problems

LATE in November, 1928, a contract was signed between the Port of New York Authority and the American Bridge Co. for 26,500 tons of steel and its erection into a bridge over the Kill van Kull, to carry highway traffic from the mainland of New Jersey into Staten Island. The main span is of the arch type; its length of 1675 ft. exceeds by 25 ft. the new arch bridge across the harbor at Sydney, Australia. These bridges are twice as long as the arch across the gorge at Niagara Falls, and exceed the 1017-ft. Hell Gate arch by a wide margin.

Such unprecedented spans involve unusual loads on the main members, and high-strength steel is utilized to reduce the dead load of the structure. In the Hell Gate bridge this extra strength was secured by raising the carbon considerably above the ordinary structural grade. In the Sydney bridge the main members are fabricated of heat-treated steel. Specifications for the Kill van Kull bridge, upon which bids were invited, provided for the use of conventional nickel steel of the following characteristics:

Carbon	0.40 per cent
Manganese	1.0 per cent
Nickel	3.25 per cent
Ultimate strength ..	90,000 lb. per sq. in. (minimum)
Yield point	55,000 lb. per sq. in. (minimum)

This grade of steel had been used for many important bridges in the last 20 years; its manufacture and fabrication are well known and its record in service has been excellent. Consequently, it was regarded as the correct material for the heavy bottom chords of the main arch (which carry the main loads, the top chords and the web members serving essentially to stiffen the bottom chords).

Realizing the possibility that other high-grade steels equivalent to structural nickel steel were available, the Port Authority also provided in the specifications that the contractor might substitute, with the approval of the chief engineer of the Port Authority, an alloy steel which would meet the physical properties specified and which would be otherwise fully equivalent to nickel steel.

In January, the American Bridge Co., the low bidder on the steelwork, submitted a proposal to furnish medium-manganese steel of the following properties:

Maximum carbon ...	0.40 per cent
Preferred carbon ...	0.35 per cent
Maximum manganese	1.80 per cent
Ultimate strength ..	90,000 lb. per sq. in. (minimum)
Yield point	55,000 lb. per sq. in. (minimum)

Elongation in 8 in. is to be not less than 1,600,000 divided by the ultimate tensile strength, which figures to 16 per cent for 100,000-lb. material.

Acceptance of this proposition would mean that the Kill van Kull bridge would have main members constructed of steel never before used in such a way. The American Bridge Co., in supporting the claim that medium-manganese steel would be suitable, cited experiments made by the Carnegie Steel Co., and also informed the Port Authority that such material had passed successfully through the process of fabrication into crane girders. A substantial reduction in cost was also tendered. This was made possible as the cumulative sum of several different factors: (a) the cost of manganese per pound is less than the cost of nickel; (b) the percentage of manganese metal

(Concluded on page 1680)





BOOK REVIEWS



Art in Early Iron Founding

CAST iron is now used in such a variety of ways that it is difficult to imagine the times when it was a new substance, and its producers puzzled about how it could be sold. Antiquarians hold that its first use was for stove plates—not the flat and utilitarian lids or grills we make into ranges now, but the ornamental slabs built into those monumental structures beloved by the German and Swiss householder.

Recognizing that these early castings represented not only the beginnings of iron smelting, but also of iron founding practice, as well as being relics of the art of relief modeling and historical documents about the manners and customs of the period, the German Iron Masters Association, Düsseldorf, has gathered a collection of these ancient plates. Dr. Albrecht Kippenberger has composed a general account of the art ("Die Kunst der Ofenplatten," published by Verlag Stahleisen, Düsseldorf, Germany), together with notes and illustrations of unusual examples of other art forms, such as andirons, memorial tablets and watering troughs. The major part of the book consists of full-page rotogravures of 69 examples from the Iron Masters' collection, each with a critical commentary.

Ores and Valuable Rocks

WHILE most consumers of metals are content to receive them from a supplier without curiosity about the primary source of the material, here and there are people, even among manufacturers, who are interested in such collateral matters. Such (and those in the metal producing industry who are charged with procuring the ores) will be interested in two excellent foreign publications. "The Elements of Economic Geology," by J. W. Gregory, professor of geology at the University of Glasgow (E. P. Dutton & Co., New York, price \$3.25), is interesting because such a large field has been successfully compressed into 300 pages. Outside reading is invited by numerous text references to authorities writing within the last few years. The second publication of note is an atlas, with eight beautifully colored maps locating the known mineral deposits of both hemispheres. A 300-page volume is necessary to list supplementary information about the localities indicated on the map, such as the name of the deposit, its geographical location, the character of the deposit and the geological horizon, and the production in 1913 and 1923. Atlas and catalog have been compiled by the Prussian Geological Institute and published by Dietrich Reimer & Ernst Vohsen, Berlin, Germany. The price is 54 R.M.

A collection of essays on "The Profession of Engineering" has been issued in book form by John Wiley & Sons, Inc., New York (124 pages, 4¾ x 7½ in., price \$1.50). For the most part they are from writings and speeches of eminent engineers. Such men, at times, make commencement addresses, or on other occasions are led to describe their profession, its opportunities and responsibilities, as they see it. The book's chief value is to be put into the hands of a young man who thinks he wishes to become an engineer, but is at a loss to know in what line of engineering he should study the hardest. The book should help such a one to form a correct opinion.

Tin: Salient Facts and Opinions. By J. A. L. Gallard and Murray Stuart. 46 pages. Published by Mining Publications, Ltd., London, England. Price, 2s. 6d.

This booklet of 46 pages concerns itself with the financial and general aspects of tin, discussing such factors as price stabilization, America and tin, as well as the advocacy for tin shares as investments in the United States. All of the companies cited as examples are British controlled. There is a short section on the geology and mining of tin. The book closes with a discussion of the possible effect which the American Tin Trade Association will have on the compilation of those statistics for the protection of the industry from the violent fluctuations for which it is notorious.

C. L. MANTELL.

Technical Electrochemistry. Vol. IV. Electric Furnaces (in German). By Dr. Jean Billiter. 300 pages, 6½ x 9½ in., 190 illustrations, price, paper-bound copy, 19.50 gold marks. Published by Wilhelm Knapp, Halle (Saale), Germany.

The title of this volume by Prof. Jean Billiter of the University of Vienna is somewhat misleading, since it is confined to electric furnaces for the production of chemical products. The eight chapters are devoted to carborundum, Acheson graphite, phosphorus and phosphoric acid, carbon bisulphide, calcium carbide, nitric acid by the arc process, aluminum nitride, cyanamid and cyanide. The electric furnaces used in the steel industry and in the production of ferroalloys are not considered. However, the discussion of the general principles of the electric furnace is gone into at some length and occupies almost fifty pages.

It is gratifying indeed to note the frequent references to a large number of American inventors, such as Tone, Carothers, Cottrell, Acheson, Landis, Bradley, Castner, Taylor, and Richards. Although the Söderberg electrode is discussed at some length, the new Miguet electrode is not mentioned, nor is any mention made of Northrup's high frequency furnace, but this latter omission is probably due to the fact that the high frequency furnace is primarily used in the metal industry.

The book will be welcomed on account of the thoroughness with which the historical development of the various processes is gone into. It will also be found useful in the industrial plant as a handy reference book, particularly on account of the discussion of general principles and of costs.

The many good illustrations and photographs included in the volume add greatly to its value. COLIN G. FINK.

A Bookish Book on Labor

Labor Management. By Gordon S. Watkins, Ph.D. 726 pages, 5¼ x 8 in. Published by A. W. Shaw & Co., Chicago. Price, \$5.

In the beginning the author warns us that no single key will unlock the door through which the situation of the perplexing problems of employment is destined to come. He does not state what most of us know: that a battering ram is less likely to make a passage that will be used cheerfully or permanently. He does not properly define "labor"; for there is no such thing as "labor" pure and simple, as one might say "brick clay" or "dollars." There are too many kinds of "labor"; some call

it "merchandise," some "service," some just "labor," without knowing or perhaps caring exactly.

The book is too voluminous to permit an adequate review in limited space, so I turn to the chapter on "Turnover" as a specimen from which the whole may perhaps be judged.

I find for the first time an algebraical formula, in which symbols represent separations, interdepartment transfers, unavoidable separations, average working force and the turnover. And after I have it, I can't use it. For what is "avoidable" and what is "unavoidable" separations? If the problem were solved, there would be no such classification. And there is little use in knowing what the turnover amounts to, unless I am told how to get it down to an irreducible minimum, such as I find in a State's prison, where it is very slight.

The book tells us, of course, just what classes of workers furnish the greatest turnover and from what causes, but how is it possible for a manager to be sure of recruiting only from those classes that furnish the lowest rate? Suppose a manufacturer did succeed in obtaining the least annoying class from the quitting point of view—cutting out all the young, and unmarried, and so on, and employing only those having no adventurous spirit—how about the efficiency of the remainder? In this matter of turnover the best method seems to be, not to bother so much if it is 2 or 200 per cent, but to consider *any* figure too high, and endeavor only to reduce, *reduce*, and then REDUCE, always keeping in mind the efficiency question.

There is a good chapter on the training of employees; but the one on training executives (much misused term) is insufficient. If more executives were trained, and trained half as carefully and sensibly as the employees, the labor turnover, and the price of production (or service), would be correspondingly cut.

I put the word service in parentheses, but it is really entitled to as much consideration as material production. Clerical work, transportation and other branches of activity demand "labor" as much as the making of ships, shoes and sealing wax. Yet we seldom think of services, but consider turnover and all other labor problems in terms of cars-per-day of so many hours.

There is really so much of this book that one cannot see the forest for the trees. To my mind, the average brickmaker or insurance company president would get but little from it. It would have been better to have taken more time and made it shorter. ROBERT GRIMSHAW.

Brief Notes on Other Books

Bulletin 476 of the United States Bureau of Labor Statistics details in 170 pages the wages and hours of union labor in 1927 and 1928 in a wide variety of industries scattered all over the country. Copies of the bulletin may be obtained at 25c. each from the Government Printing Office, Washington.

Another edition of the Blue Book of Southern Progress has come from the press of *Manufacturers Record*, Baltimore (324 pages, price 50c.). It contains facts about the economic advancement of the South and gives many comparisons with corresponding data for the United States as a whole. Industrial output in the South has increased from \$1,693,000,000 in 1900 to \$12,200,000,000 in 1927. Of this latter amount the great bulk was manufactures, which amounted to \$10,371,000,000.

"Metal Statistics, 1929," published by the *American Metal Market*, New York, has just been issued as the twenty-second annual edition. It contains the same general information about ferrous and non-ferrous metals found in previous editions, with a few new tables introduced.

Bulletin 299 of the United States Bureau of Mines deals with problems of the production and utilization of metallurgical limestone (price 10c.). About 26,000,000 tons of this material was used in the United States in 1926, chiefly in the smelting of iron ore in the blast furnace. It is estimated that the cost of production averages about 67c. a ton.

Productivity of labor in merchant blast furnaces is discussed in Bulletin 474 of the United States Bureau of Labor Statistics (150 pages, price 25c.). It appears that the productivity in 1926 was more than twice as great as in 1912-1914. A gross ton of pig iron was formerly produced by more than seven hours of labor, while now the time required is 3 hr. 23 min. Much other tabular matter and explanatory text are given. Figures are carried out to the middle of 1927 in some instances.

"Facts and Figures of the Automobile Industry" for last year are given in the 1929 edition issued by the National Automobile Chamber of Commerce, 366 Madison Avenue, New York. Registration and production figures are given in great detail, particularly for the United States and Canada. The 1928 production of the United States represented 84 per cent of the total for the world. Canada has second position, making 242,382 units, France third with 210,000, followed by England, 208,400; Germany, 89,950; and Italy, 55,010. Total registration for the world is now given at 31,778,203, of which 79 per cent are in the United States. Exports show gains over 1927, but a progressive reduction since 1925 in foreign assemblies. Annual replacements are figured now at 2,450,000 in the American market, with an average car life of 6½ years. The replacement figure has shown a steady increase since 1920.

New Books Received

Present-Day Labor Relations. By Paul F. Gemmill. Pages 312, 6¼ x 9¼ in., illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price \$3.

History of Mechanical Inventions. By Abbott Payson Usher. Pages 401, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$5.

Picture of World Economic Conditions at the Beginning of 1929. Pages 253, 6 x 9¼ in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$2.50.

Der Einfluss von Oberflächenbeschädigungen auf die Biegungsschwingungsfestigkeit. By W. Zander. Pages 65, 6 x 9 in., illustrated. Published by NEM, Matthäikirchstrasse 10, Berlin W 10, Germany.

Commodity Exchanges. By Julius B. Baer and George P. Woodruff. Pages 319, 5½ x 8½ in., illustrated. Published by Harper & Brothers, 49 East Thirty-third Street, New York. Price, \$5.

Arc Welding.—Lincoln Prize Papers. Submitted to the American Society of Mechanical Engineers. Pages 421, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$5.

Industrial Standardization. Pages 306, 6 x 9¼ in., illustrated. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$3.50.

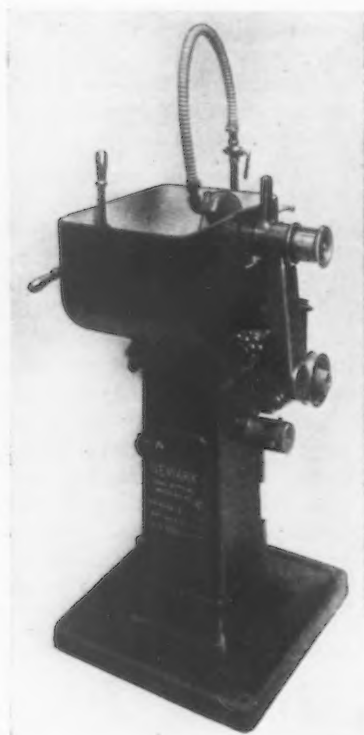
Principles of Metallurgy. By John L. Bray. Pages 568, 6¼ x 9¼ in., illustrated. Published by Ginn & Co., 15 Ashburton Place, Boston. Price, \$5.80.

Organisation und Selbstkostenberechnung in den Metallgiessereien. By E. Becker. Pages 96, 6½ x 9¼ in., illustrated. Published by Wilhelm Knapp, Halle (Saale), Germany. Price, 6.80 m.

Improved Cutter-Sharpening Machine

AN improved cutter-sharpening machine for formed tooth cutters and gashing cutters has been developed by the Newark Gear-Cutting Machine Co., Newark, N. J. This machine, called No. 0, sharpens cutters from the smallest diameters up to 10 in. in diameter. The principle

the entire cutting face at one setting, due to a central web. In that case the cutter-holding table is tilted, both sides of horizontal, thus enabling the complete cutting edge to be ground. It is claimed that this is the only machine which conveniently permits heavy pitch cutters to be sharpened



ABOVE is Shown the Method of Indexing the Cutter from One Tooth to the Next. At left appears the pivoted lever carrying the grinder spindle

employed is practically the same as in the older design, one of the outstanding improvements being wheel spindle equipped with Timken bearings.

This spindle is made of high-carbon steel. It is carried on a heavy lever that is pivoted about half-way down the base, making it possible for the operator to pass the wheel back and forth across the face of the cutter. His right hand grasps the handle above the spindle. The travel of the wheel inward is governed by the adjustable screw stop, against which the spindle-carrying lever contacts.

A belt transmits the power to the wheel-spindle at 2800 r.p.m. The wheel is surrounded by an adjustable guard, to which coolant is fed through a flexible hose, by a pump within a tank attached to the rear of the column.

The cutter rests upon a table which carries a central stud. Different cutter holes are made to fit the stud with adapter bushings. The grinding face of the wheel is adjusted in relation to the center of the cutter by a separate gage, which is applied when setting up. In this way the machine may be quickly set to grind a radial tooth or an undercut tooth of any required hook-angle.

When sharpening this type of cutter, it is often impossible to grind

without turning the cutter over, or changing grinding wheels.

The cutter is indexed from tooth to tooth by the left hand of the operator, who locates it by means of a spring-pawl resting against the back of the tooth being ground. The machine is equipped with a diamond and truing device for dressing the grinding wheel. The column is box construction, with cabinet for wheels, bushings and wrenches. The machine is most compact in design, requiring about 24 by 30-in. floor space, and has a net weight of about 925 lb.

Dust-Tight Inclosures for Starters

DEVELOPMENT of dust-tight inclosing cases for across-the-line automatic starters has been made by Cutler-Hammer, Inc., Milwaukee. These new inclosures are built in two types: For motors up to 5 hp., the case is of cast iron; for larger sizes it is made of heavy welded boiler plate. They are provided with a soft Para rubber gasket between cover and case. Eye bolts with wing nuts at the sides hold the cover tight.

In addition to being dust-tight, the small cast iron inclosure is also weatherproof. It has the start, stop and reset buttons mounted directly in

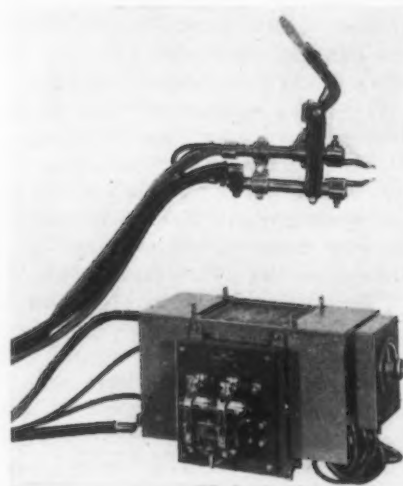
the cover. The larger sizes have the reset button only in the cover, and a separate dust-tight push-button station provides remote control.

Spot Welder for Inaccessible Joints

THE 25 kw. portable spot welder shown in the photograph has been placed on the market by the Thomson Electric Welding Co., Lynn, Mass. On the front of the transformer is mounted a magnetic wall switch; at the side is a five-point regulator, connected to the tapped primary coil of the transformer, to vary the welding voltage and current for different thicknesses of material.

The unit is provided with four ears for suspension from overhead, or if desired it may also be mounted on casters.

To the water cooled terminals of the transformer secondary are attached large extra-flexible cables terminating in a pair of water cooled pliers, to which welding electrodes of various shapes may be attached. Pressure on the welding points is obtained through a hand lever, operating a rack and pinion. Current control is through a push-button switch mounted on the hand



Spot Welding Dies May Be Taken to the Joint

lever, and connected to the magnetic switch.

The transformer is designed to give the high welding voltage which is necessary when using long cables. Various lengths of flexible cable may be supplied up to 12 ft. The unit is particularly applicable to welding light sheet metal parts which, because of their shape or overall dimensions, are difficult to bring to the conventional type of spot welding machine.

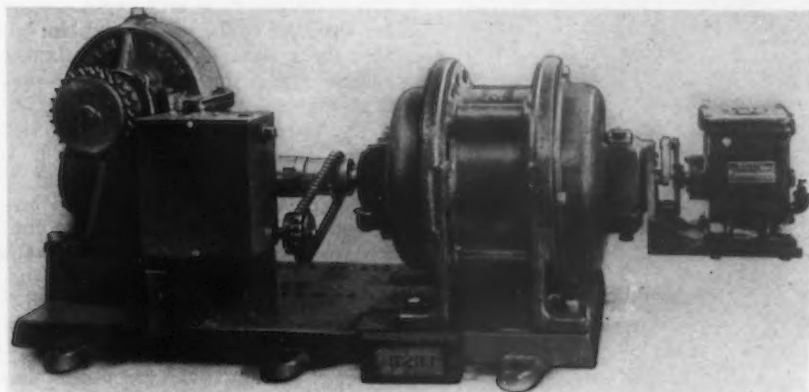
Offices of the hoist and crane division of Robbins & Myers, Inc., Springfield, Ohio, will be moved from Cleveland to Springfield, June 15. Frank F. Seaman is general manager and John R. Mears, sales manager.

Electric Furnace Door-Operating Mechanism

BY E. B. SMITH*

TO avoid the cost of manually opening and closing doors of several electric furnaces used for heat treating, the Thompson Products Co., Cleveland, manufacturer of airplane engine valves, has installed motor-operated door-opening and closing mechanism. The motors are 3-hp., 900-r.p.m., 440-volt, 3-phase 60-cycle units

After the ticker relay has operated and started the door in the closing operation closing will continue until the limit switch trips and the relay plugs to rest again. The time the door remains open is, of course, adjustable throughout the range of the ticker relay; this may be disconnected from the circuit at will, and the door closed



Limit Switches Prevent This Door-Operating Mechanism from Over-running. A ticker relay governs the length of time of full opening

mounted on the same bases with the worm-gear reducing units.

All bases, gears, sprockets and chains were secured from the Boston Gear Works Co. and the motors and controls from the General Electric Co. The total speed reduction from motor to shafting carrying the furnace door and counterweight was approximately 80 to 1.

Operation of the equipment is as follows: Pressure on a foot-operated push-button causes the motor to raise the door, which continues to open until the limit switch (mounted on the base with the motor and chain driven from it) opens the circuit. At this time the relay "plugs" the motor to rest. The ticker relay then comes into operation and governs the time the door remains open.

*General Electric Co., Cleveland.

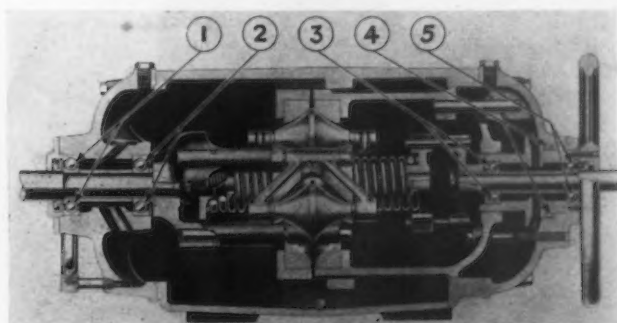
by a second button. The most difficult part of the application is to secure an easy stop at the lower end of the closing operation. A sudden bang of the door on the hearth would upset the valves, which are required to stand upright.

To overcome this some special centering springs were installed on the relay, which makes it possible accurately to adjust the time at which the relay lets go. The springs enable the relay to be so adjusted that it is returned to the neutral position before the motor comes to rest. This lets the door coast to final position rather than be driven down by the motor. Stopping at the upper end of travel is not so important as at the lower; therefore a much more accurate adjustment of the centering springs can be secured.

Speed Changer Equipped with Ball Bearings

IMPROVEMENT of its JFS variable reducer transmission has been made by Stephens-Adamson Mfg. Co., Aurora, Ill., by the incorporation of

high-grade ball bearing mountings throughout the machine. All sizes and types have been equipped with five ball bearings in each frame at



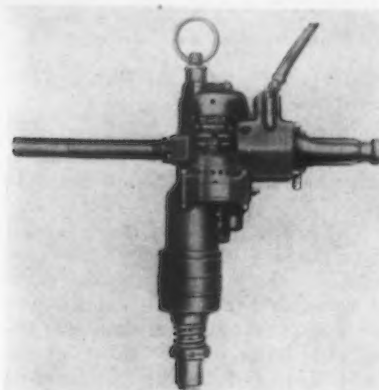
Five Ball Bearings, Located as Shown in Cut, Feature This Speed-Changing Device

vital points. The internal circulation of the oil bath is accomplished through splashing the revolving parts.

There are two ball bearings supporting the high-speed shaft and two supporting the variable-speed shaft. The oil drain in each bearing cavity is arranged at a height to insure a constant supply of lubricant at all times.

Improvements in Design in Electric Tools

REFINEMENTS and improvements have been made by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, in its line of portable electric tools, including drills, reamers, nut runners, screw drivers, tappers, grinders, buffers, sanders and stud setters.



Above Is the New Hicycle Nut Runner; Below, the Portable Grinder



The new line is known as the Hicycle series, having been developed from a series of the same name illustrated and described on page 351 of our issue for Aug. 6, 1925.

Two of the new units are shown in the illustration. These are the No. 40-N nut runner, with capacity up to $\frac{1}{2}$ -in. bolt diameter, and the No. 60 grinder, taking a 6-in. wheel. The nut runner weighs 18 lb. and is 18 in. long over all. The loaded speed varies from 1025 r.p.m. for nuts on $\frac{3}{8}$ -in. bolts to 250 r.p.m. for the maximum size.

The Fafnir Bearing Co., New Britain, Conn., has established a separate division to cooperate with aviation companies in the development of suitable ball bearings for use in airplane construction. This company supplied ball bearings for such outstanding motors used in the war, as Hispano Suiza, LeRhône and Liberty engines.

Crane Tractor for Flexibility of Service

IN many plants a crane tractor is needed, not only to haul trailers but to provide facilities for loading them. The Elwell-Parker Electric Co., Cleveland, provides such a machine in the new heavy-duty 6000-lb. carrying ca-

towing purposes, its platform is available for direct loading. In the machine tool, shipbuilding, automobile and similar industries, this tool, with its large tractor power, large wheels and clearances, may go into storage,



This Equipment Can Load Itself

capacity tractor with 1500-lb. crane lift capacity. This tool has a large-capacity battery to meet haulage conditions.

The crane is of the revolving and luffing type. Its double-drum hoisting unit, which lifts or lowers either the boom or the hook, is motor powered and is driven from the same battery supplying power to the propelling motor and to the platform-lift motor. The main truck frame is heavily built, from operator's pedals to end of platform.

When the tractor is not used for

bring a large casting into the shop and place it on machine planer bed, etc.

The machine is essentially a one-man tool that enables the operator to lift 1500-lb. loads on to skids and later to pick up a skid load of 6000 lb. for transport at 3 to 5 miles an hour. Crane loads may be picked up over end of platform or at any angle up to 90 deg. to either side. Alloy-steel drive mechanism, as well as inclosed fuseless motors, are employed. The wide tread of drive and trail tires assures good traction, even on poor runways.

means of a hole in the bottom of this slide, which will carry a bar in which the tool can be mounted. This comes in very handy in machining the inside of frames.

A special rail was built to support the top of the saddle and gives the rail a third way. This saddle rides on this third way by means of a roller bearing. A narrow guide is also provided to this saddle to eliminate all twisting moments.

A self-contained counter balance is used so as to take care of the additional weight of these long slides. The standard feed and rapid traverse are supplied to the heads, and the hand feed is operated through a special square placed on top of the slide so that the operator can adjust his tool.

The harp which carries the slide is bolted through by means of a tee slot, which is placed on top of the saddle to assist the operator in swiveling the head. Rack teeth are cut in the harp and a pinion runs into this; thus the crank handle, which is used for moving the heads, can be used for swiveling the head.

A supplementary rolling table is supplied so that, when machining doors up to 10 ft. square, the extreme overhang is supported by means of this table.

The detail picture shows the back of the rail. In place of using a mechanical device for clamping the rail, a torque motor is operated by means of a push button, which is supplied on both sides of this machine. This method clamps the rail tighter than it could be clamped by means of a wrench. A safety device makes it impossible to raise and lower the rail while clamped.

This machine, which is built by the Cincinnati Planer Co., has reduced the time on machining certain size doors from 8 hr. to 5 hr.

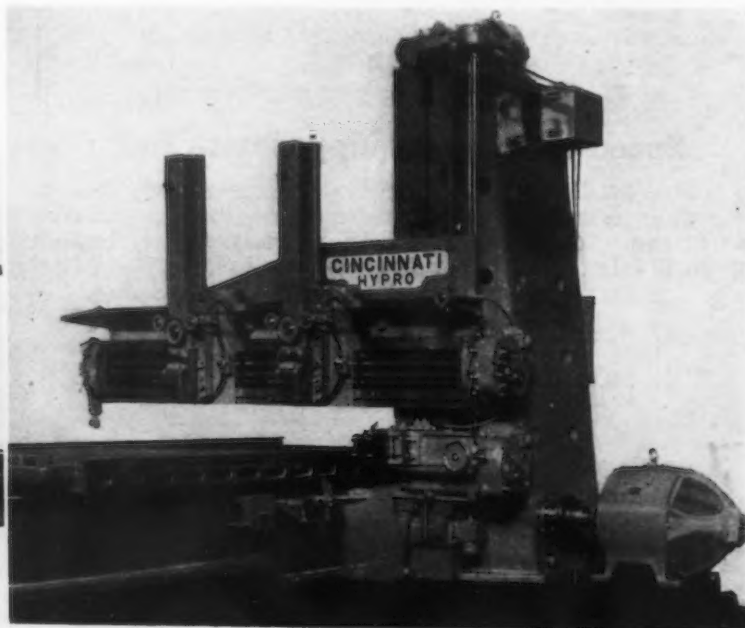
Openside Planer Adapted for Safe Doors and Frames

THE accompanying illustrations show a special openside planer which was designed particularly for machining safe doors and frames. The head is equipped with a long steel slide, which permits a reach 40 in. below the bottom of the rail. The head is equipped with two means of hold-

ing tools. One is the regular clapper box and tool block and the other is by



This 96-In. Cincinnati Planer Has a 40-In. Reach Below Bottom of the Rail. The close-up shows the back of the rail



Linde Air Products Co. has opened an oxygen producing plant at Oklahoma City, Okla. F. K. Buckalew is superintendent.

Decimal System For Gages Indorsed

National Association of Purchasing Agents Passes Resolution Recommending Such Standardization—J. R. Whitehead, Chicago, Elected President

THE National Association of Purchasing Agents in convention at Buffalo last week went on record as favoring the general use of the decimal system for designating gages of metal products. The resolution follows:

Inasmuch as there are numerous gage systems to designate metal sizes in more or less general use, resulting frequently in confusion, errors and loss, and in spite of long use of these systems and their real value from certain standpoints, it is hereby resolved that the National Association of Purchasing Agents deplores the existence of these many systems, favors a sensible standardization of size description and therefore recommends the general use and popularization of the decimal system.

Standardization of gages was urged by A. P. Hickcox, Scovill Mfg. Co., Waterbury, Conn., in a paper read to the convention.

The association also recommended the general adoption of the standard coal contract form prepared by the National Coal Association in cooperation with the purchasing agents' organization.

J. R. Whitehead Elected President

J. R. Whitehead, Fairbanks Morse & Co., Chicago, was elected president, succeeding Albert W. Bowman of the Humble Oil Co., Houston, Tex.

Vice-presidents were elected as follows: Paul R. Brennan, Stafford Co., Readville, Mass.; E. H. Weaver, Union Oil Co. of California, Seattle, Wash.; B. C. Sawyer, Bethlehem Fabricators, Inc., Bethlehem, Pa.; D. B. Robinson, Tri-State Telephone & Telegraph Co., St. Paul; N. B. Rhoads, Board of Port Commissioners, New Orleans; Joseph E. Mills, commissioner of purchases and supplies, Detroit; R. E. Miller, Deming Co., Salem, Ohio; W. R. Heyman, Oklahoma Gas & Electric Co., Oklahoma City; T. G. Elliott, Babcock-Wilcox & Goldie, McCulloch, Ltd., Galt, Ont., Canada; Ralph D. Berry, Davol Rubber Co., Providence, R. I.

Chicago was selected as the place to meet in 1930 and the tentative date decided upon was June 16.

Tool Steel Standardization Urged

An effort will be made by the iron and steel committee of the association to arrive at standard specification for tool steel. This subject was discussed at one of the meetings of the committee by Claude J. Black, purchasing agent, Indiana Limestone Co., Bedford, Ind., who reported that very little progress has been made but that the committee will continue to discuss the matter with manufacturers of tool steel and the users and

will make a further report at the next annual convention.

L. V. Guild, purchasing agent of the Oregon Short Line, said that the purchase of tool steel creates a difficult problem for the railroads because it is virtually impossible to issue a specification owing to the lack of standardization. The railroads, he said, have no means of comparing various tool steels except by long and



J. R. WHITEHEAD
New President of National Association of Purchasing Agents

expensive tests, which are difficult because few of them have their own laboratories.

Another subject discussed by the iron and steel committee was the standardization of color marking of steel. This discussion was led by F. J. Schlink, assistant secretary of the American Standards Association, New York. The opinion of the purchasing agents who buy steel products was that a standard color marking scheme would be of great value to all buyers of steel.

W. H. Bryant, assistant manager of sales, Joseph T. Ryerson & Son, Inc., Chicago, discussed the new extras on cold-rolled strip steel. He said that no serious objections have been raised because of new extras by consumers of cold-rolled strip and he believed the extras to be fair to both sellers and buyers. He added that the mills could not long maintain unfair differentials, and, if inequalities exist, they will be ironed out.

Asks Cooperation with Scrap Institute

Another meeting of the iron and steel committee was addressed by

Benjamin Schwartz, director-general of the Institute of Scrap Iron and Steel, New York. Mr. Schwartz made a plea for the cooperation of the purchasing agents in the program which the scrap institute has recently adopted under the auspices of the Federal Trade Commission to bring about the elimination of unfair practices in the scrap industry.

"The most important function of the scrap industry," he said, "is to establish the machinery of cooperation with the producers and consumers of scrap. The subject of specifications is requiring a great deal of clarification. Confusion concerning specifications of scrap iron and steel has been the cause of some practices that the institute hopes to eliminate."

Mr. Schwartz said that buyers and sellers of scrap should keep in mind that scrap iron and steel is not a finished product, made according to specifications, but is a by-product, and therefore all scrap shipments could be rejected if certain interpretations of specifications are made. Mr. Schwartz urged that more careful attention be given to the preparation of scrap at the producing plant. He said that such careful preparation would result in a greater cash return to the producers.

C. R. Ramage, purchasing agent of the Diamond Chain & Mfg. Co., Indianapolis, presided at one session of the iron and steel group, and W. W. MacMillen, general purchasing agent of the National Malleable & Steel Castings Co., Cleveland, and A. J. Copeland, Industrial Brownhoist Corporation, Bay City, Mich., presided at the others.

Urges Waste Elimination in Distribution

At the opening general session of the convention Ray M. Hudson of the Department of Commerce, Washington, discussed the simplification program which the department has had under way for some years. He said that 126 simplified practice recommendations covering almost every major commodity field have been completed, and the future work of the department will be concentrated to a large extent on the other lines which have not yet been covered. Mr. Hudson urged the cutting out of waste in every phase of distribution. He said that purchasing agents could contribute a great deal toward cutting down distribution costs by simplifying the flow of goods.

W. E. Humphrey of the Federal Trade Commission discussed the trade practice conference plan as it is being

developed by the commission in cooperation with representatives of various lines of industry.

Expects Decline in Steel Output

That the recent record rate of steel production represents the peak for 1929 was the conclusion of H. N. McGill, Auburndale, Mass., a business statistician. He said that demand for steel is now in the early stages of a slump, and he thought that unfilled steel orders have run their upward course for the present. He added:

"There is no room for pessimism, for it is well known that the future business prospects of this country are excellent, and the fundamental growth

line will be upward decade after decade. Yet the human equation will always enter into business; therefore intermittent periods of reaction will follow every period of overexpansion. We are on the crest of one of these waves right now. That is why I state emphatically that during the last half of 1929 there will be a distinct lowering in the production of steel, and this could easily lead to price concessions in the general list of steel products."

With respect to pig iron, he said that iron prices are not high and "therefore there is no room for a serious price shakedown."

The association's exhibit of manu-

factured products, called the "Informashow," was held on the top floor of the Statler Hotel. Sixty companies had display space and a number of others used wall space. A silver cup was awarded to the American Steel & Wire Co. for the most attractive exhibit and a similar cup was awarded to the Pittsburgh Coal Co. for the most informative exhibit. The decisions were reached by secret ballot among the purchasing agents. The exhibitors presented a testimonial to William J. Gamble of the Vulcan Steam Forging Co., Buffalo, who was chairman of the committee which had charge of all the arrangements for the exhibit.

Urges Adoption of the Decimal System for Metal Products

ADoption of the decimal system was urged by A. P. Hickcox, Scovill Mfg. Co., Waterbury, Conn., in a paper on "Standardization of Gages," Mr. Hickcox said:

"Attempts have been made occasionally during the past forty years to overcome the confusion resulting from the use of a large number of gage systems, primarily in connection with metals. Very few noteworthy results have come from attempts to simplify and standardize the use of some one system.

"One significant change has taken place, however. The new list of extras adopted by producers of cold-rolled strip steel was generally put into effect on April 1, and here we find the U. S. standard gage in use instead of the Birmingham and Stubs system which had for many years appeared on the old list of extras for cold-rolled strip steel.

"Representatives of this industry maintain that there were several good reasons for changing over. In the first place the raw material, namely, hot-rolled strip steel, was usually ordered according to the U. S. gage system and the natural thing for them to do was to adopt the same system for their cold-rolled product, thus leading to sensible standardization and simplification. In the second place the U. S. standard system is the only system with official governmental sanction, having been adopted by an act of Congress in 1893 to cover all uncoated sheet and plate iron and steel.

"This recognized commercial standard is the legal system used in determining duties and taxes levied by the United States. It is a weight gage based upon weight in ounces per square foot surface. The cold-rolled strip steel group therefore believed they were making a step in the right direction to adopt the only legal standardized gage system in this country. This group also believes that the U. S. gage system will and should grow in popular favor and should come into general use.

Objections to Existing Gage Systems

"The U. S. standard gage system, being based upon weights per square

foot of surfaces, is subject to some criticism because of the different specific gravity of various metals and likewise a difference in weights of the same metals under various conditions. For instance, the density of wrought iron, as a basis for the U. S. standard gage system, is figured as 480 lb. per cu. ft., whereas steel figures 489.6 lb. per cu. ft. Rolling tends to change the density of steel slightly, and other variables such as carbon content have a similar effect. The law in connection with the use of this gage provides a tolerance of plus or minus 2½ per cent, but it has been very difficult to keep within this tolerance, particularly on the heavier plate. The use of this gage except for flat metal has not been common.

"Whereas the U. S. standard gage system has been developed on a scientific basis and very carefully worked out, it is extremely difficult to understand on what basis certain other gage systems have been worked out. There is another exception in the case of the American or Brown & Sharpe system, which is used very extensive-

ly, especially in the non-ferrous group of metals. This system was prepared years ago very carefully by J. R. Brown and Lucian Sharpe, and was adopted by the Association of Brass Manufacturers as early as February, 1857. The difference between any two successive sizes is a constant proportion of the smaller of the two sizes, 0.1229322, or 12.29322 per cent.

"This Brown & Sharpe system certainly has stood the test of time and is very easy to use, but when it is used just by gage number without decimal equivalent, no one is absolutely sure that it is the Brown & Sharpe gage. This general statement applies to all numbered gage systems. It is necessary to name the gage system used or record decimal equivalents to make the meaning clear.

"The percentage difference between gage numbers in various systems is interesting. It varies from close uniformity as in the case of the Brown & Sharpe system, to a variation, for instance, in ratio from a low of 12 per cent to a high of 37.2 per cent, based on the diameter squared, in the Roebling, or Washburn and Moen gage system and from a low of 11.6 per cent to a high of 96 per cent based on the diameter squared, in the Birmingham wire gage system. Similar comparisons for other gage systems are likely to show lack of uniformity comparable with the examples here given.

Decimal System Favorably Discussed

"Because of these different systems, it has been the hope of different groups to develop some one system that might become generally used with ultimate benefit to industry as a whole, and once more the decimal system is being favorably discussed. Recently under the general direction of the Society of Automotive Engineers various committees have been set to work on the problem. These committees are so-called technical committee No. 1 on flat stocks (chairman, S. H. Blake, General Electric Co., Schenectady, N. Y.); technical committee No. 2 on wire and rods (chairman, E. E. Rose, Westinghouse Electric & Mfg. Co., Pittsburgh); and technical committee No. 3 on tubing, piping, conduits and casing (chairman, F. H.

Good Buying Is Founded on Knowledge, Experience, Ability

THE convention keynote was expressed by Albert M. Bowman, president, as follows:

"Good buying is an accomplishment that must be founded on knowledge, experience and ability. A good buyer is not born; he is made. The making requires constant study of markets, materials, methods and men. The purchasing agent who is successful is a diligent student of what he buys, its production and application and the economic forces that establish its value. That study is never-ending because materials and markets and methods change constantly and the purchasing agent must anticipate rather than merely follow these changes."

Nullmeyer, Youngstown Sheet & Tube Co., Youngstown.) I have the honor of representing the National Association of Purchasing Agents on technical committee No. 2 on wire and rods.

"This committee is made up of nine members and to show one evidence of their interest in the subject, I am pleased to report that every member attended the last committee meeting held in New York, Friday, April 26. With a single exception the committee was very much in favor of the general adoption of the decimal system in connection with wire and rods.

Requirements Today More Exacting

"I believe we have all had one common experience, namely, that requirements these days are much more exacting than even five years ago, and where a few years ago gage number designations might have given us the sizes required with a normal variation, today it is absolutely necessary even when we use a gage number

system to specify in decimals how much variation we can stand from definite gage numbers. Inasmuch as this is our common practice, would it not be very easy to specify decimals for size in the first place rather than continue any numbered gage system with supplemental necessary explanations?

"There is no quicker method I can suggest, to bring about the common use of decimals in expressing sizes, than for the National Association of Purchasing Agents to approve the use of a decimal system and seek to get all of its thousands of members to use and popularize the decimal system. If the retention of some numbered gage system is necessary, for good reasons, it would not seem much of an additional burden always to enter decimal equivalents in parenthesis. Such practice probably would do away with many misunderstandings and be a step toward the general adoption of the decimal system."

Metal Tariff Hearings to Begin June 24

Changes in the House Bill Expected—Senate Probably Will Not Vote on Measure Until Fall

BY L. W. MOFFETT

WASHINGTON, June 11.—Hearings on the metal schedule of the House tariff bill will begin on June 24, being held in Room 212, Senate Office Building, before a subcommittee composed of Senator Reed of Pennsylvania, chairman; Senator Smoot of Utah and Senator Edge of New Jersey, Republicans, and Senator King of Utah and Senator Barley of Kentucky, Democrats. The duration of the hearings on the schedules was not set. Contrary to original plans, they will be open. It is proposed that all hearings be closed not later than July 10. Considerable doubt exists, however, that this plan can be adhered to, the view in some quarters being that they will extend beyond that date. Efforts are being made to set a date for voting on the Senate bill, but considerable objection has been raised to this proposal. Tentative consideration had been given to fixing Nov. 9 as the date, but it has been abandoned. Hearings on the free list and administrative provisions will be held before the full committee at the conclusion of subcommittee hearings.

One of the storm centers at the hearings will relate to manganese ore. The American Iron and Steel Institute will seek to have the ore placed on the free list and duties reduced on ferromanganese and other alloys, while at the same time domestic manganese ore producers will seek to have the duty increased. The House bill left the present provision unchanged, thus retaining a duty of 1c. per lb. on the contained manganese of 30 per cent or more metallic con-

tent. Senator Oddie, Republican, of Nevada, will lead the fight to have duties increased on manganese ore. For that purpose he has introduced an amendment providing a sliding scale of rates on manganese ore. Under this amendment, ore of less than 10 per cent contained manganese would be free of duty, of 10 per cent to 20 per cent, it would take a duty of $\frac{1}{2}$ c. a lb.; of 20 to 25 per cent, 1c. a lb., and of 25 per cent and more, $1\frac{1}{2}$ c. a lb.

Assuming that the Finance Committee follows precedent, it will greatly change the House bill. The many complaints that have been made about the latter, whether justified or not, are not unusual. It is historical that complaints have been made about all tariff legislation. The fact remains, however, that they may be expected to be an element in bringing about changes by the Finance Committee.

Certainly the iron and steel industry was granted few of its requests made to the House Committee on Ways and Means, a fact which has led to complaints. Other industries have also denoted dissatisfaction with the treatment they received. At the same time there are numerous protests against many rates as being too high. Coupled with this is the fact that President Hoover is on record as favoring "limited" revision. No one seems to know just what is encompassed in that phrase. There are those who think it can be met only by "adjusting" the agricultural schedule entirely upward. There are others who think that this would be too nar-

row, but that the revision should be confined to several of the schedules, the specific ones not being suggested. Still others have taken the view that changes can well be made throughout all the schedules, if not too sweeping, and still come under the category of "limited revision." The House bill apparently was intended to reflect this school of thought.

To say what the subcommittee on metals may do, as is being said in some quarters, is idle. Criticism over the selection of Senator Reed as its chairman because he comes from the most prominent iron and steel State has been answered by the statement that he should and does understand the subject. Protests that he should not have been chosen because he was one of the attorneys for the United States Steel Corporation in its dissolution suit have met with the response that that case and the tariff have no connection and he is left entire freedom of action to assist in passing upon the metal schedule as he sees fit.

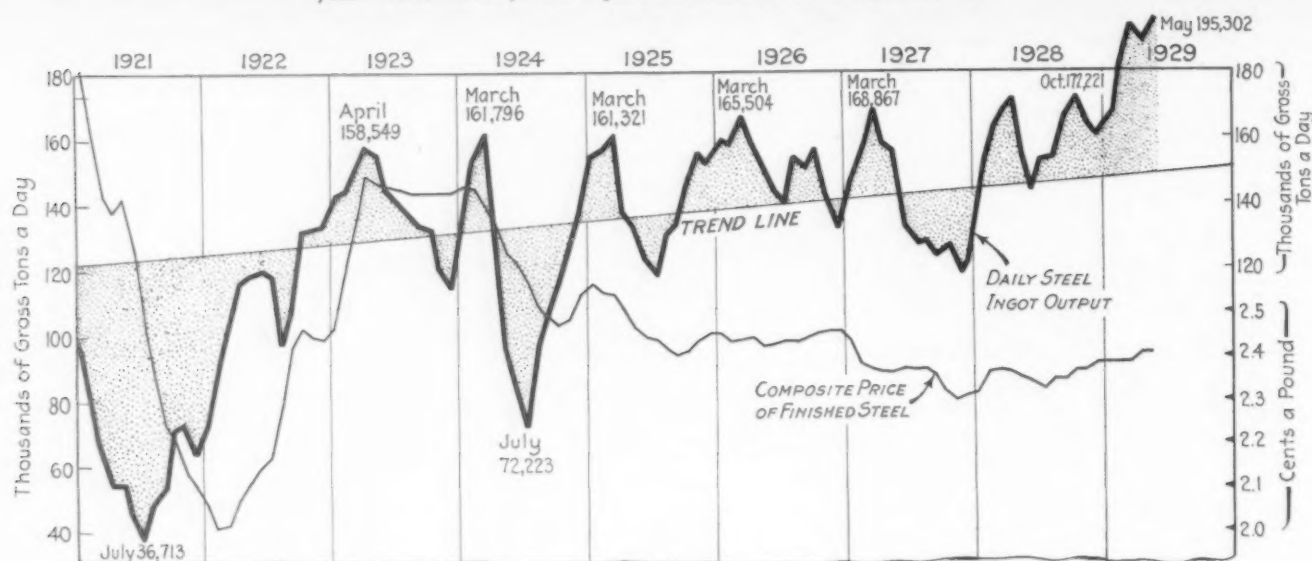
It is the plan of this subcommittee, as accords with the policy of the entire committee, to hear all interests which have important material to present, though originally consideration was given to a proposal to hear only those who had not appeared before the House Committee on Ways and Means. The upshot is expected to be a complete hearing on the metal schedule from all interests. Efforts will be made, however, to avoid duplication of testimony so far as possible.

Mexican Steel Plant Has Prosperous Year

Production of pig iron by the Monterrey Iron & Steel Works, Monterrey, Mexico, totaled 48,848 metric tons in 1928, against 40,415 tons in 1927 and 60,660 tons in 1926, according to a statement issued by the Iron and Steel Division, Department of Commerce, Washington. The output of open-hearth steel was 79,433 tons, the highest figure since 1911. This compares with 64,440 tons in 1927 and 78,098 tons in 1926. Rolling mill production was 64,810 tons, establishing a record. Of this total 22,178 tons was rails and fish plates, 20,584 tons "commercial iron bars," 13,602 tons structural steel, 8,431 tons chrome steel bars and 15 tons billets.

Several new lines of machinery were installed in efforts to diversify the output. The year was declared to be most profitable in nearly every line. The pipe plant did not operate in 1928. The structural department fabricated 2624 tons of steel, and the foundry and electric furnace department produced 2458 tons of castings and 292 tons of electric steel. The year saw the addition of a unit to the company's line, a wire plant with nine drawing machines, which produced 2124 tons in the short time they were in operation during the closing months of the year.

Ingot Production in May Was the Highest Ever Reached. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in May were 3 per cent better than at midyear of 1928



Steel Ingots Make Another Record

Production in May Largest Ever Achieved—Output in Five Months More Than 24,000,000 Tons, Which Is 3,000,000 Tons Above 1928

ANOTHER unprecedented outpouring of steel ingots was registered in May, the figures for the month and for the daily average exceeding all previous tonnages. Calculated output for all companies as reported by the American Iron and Steel Institute was 5,273,167 gross tons, which, with 27 working days, made an average of 195,302 tons daily. This displaces the previous record of 5,058,258 tons made in March when, with 26 working days, the daily average was 194,548 tons. Compared with April, there was a gain of almost 7 per

cent in total tonnage and 3 per cent in daily rate, and April was, with the exception of March, the highest previous month.

Open-hearth production in May was 250,000 tons more than in April. It was more than 90,000 tons above the previous high record reached in March. But it was Bessemer tonnage which showed the greatest relative increase, both compared with April and compared with March. Based on the March record, open-hearth output gained 2.2 per cent, whereas Bessemer production showed an increase of 18.6 per cent. Com-

pared with April the open-hearth output advanced 6.2 per cent, whereas the Bessemer production recorded an increase of 10.5 per cent. Bessemer tonnage reported in May gained 110,793 over March; open-hearth tonnage gained 92,317.

For the first five months of the year the calculated total of Bessemer and open-hearth steel ingots is 24,085,804 tons. This compares with 21,054,170 tons for the like period last year and represents an increase of more than 14 per cent. Inasmuch as the first five months of 1928 made the previous record for that period, the gain as compared with all previous years is even greater.

Never, preceding this year, has the production for any five consecutive months come within 10 per cent of the current figure. The largest such group of months was found in 1928, from Aug. 1 to Dec. 31, when the output aggregated 21,261,514 tons. And, except in 1928, no full half-year has shown as large a tonnage as the first five months of 1929. The greatest, previous to 1928, was the first half of 1926, with 24,153,809 tons. As this included about 175,000 tons of electric and crucible steel ingots, the true comparison shows the current five months the greater.

Electric and crucible steel ingots, no longer reported monthly, amounted to 460,208 gross tons in 1928. In spite of a shrinkage in crucible steel, amounting almost to the disappearance of that product, the record-breaking tonnage of electric steel made this aggregate the largest ever reported for any year. On the basis of 311 working days, this figures out at 1480 tons a day.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,273,294	498,691	3,990,902	26	153,496
February	3,300,407	521,250	4,043,457	25	161,738
March	3,692,648	567,330	4,507,217	27	166,934
April	3,505,104	564,110	4,305,382	25	172,215
May	3,394,301	582,128	4,207,212	27	155,823
Five months	17,165,754	2,733,509	21,054,170	130	161,955
June	3,010,341	528,193	3,743,903	26	143,996
July	3,068,257	528,588	3,805,598	25	152,224
August	3,379,625	569,771	4,178,610	27	154,763
September	3,375,654	544,710	4,147,893	25	165,916
October	3,795,800	599,098	4,649,968	27	172,221
November	3,442,112	590,669	4,266,835	26	164,109
December	3,301,114	496,679	4,018,208	25	160,728
Year	40,538,657	6,591,217	49,865,185	311	160,339
1929					
January	3,694,218	549,616	4,490,354	27	166,309
February	3,599,224	489,279	4,326,000	24	180,250
March	4,183,869	596,691	5,058,258	26	194,548
April	4,026,576	640,351	4,938,025	26	189,924
May	4,276,186	707,484	5,273,167	27	195,302
Five months	19,780,073	2,983,421	24,085,804	130	185,275

Pig Iron Strong in Great Britain

More Furnaces Lighted—German Reparations Deliveries Reach New Maximum—May Control British Scrap Exports

(By Cable)

LONDON, ENGLAND, June 10.

PIG IRON is strong, and Cleveland makers are out of the market with order books filled to October and considering further advances when they reopen their books for new contracts.

Continental pig iron is no longer competitive here and British producers are regaining some of their markets abroad.

Hematite production is to be increased shortly by blowing in three more furnaces, of which the Linthorpe-Dinsdale Smelting Co., Middlesbrough, is restarting two furnaces idle for three years. Hematite prices are unchanged, but increasing costs are making early advances inevitable and East Coast hematite producers' order books are better filled than for a number of years.

The steel market is unchanged with mills moderately well engaged on orders secured prior to the Whitsun holidays and specifications coming in more freely. New business, both domestic and export, is generally quiet.

Continental material is quiet here, especially for semi-finished steel, as users are generally buying British material.

Tin plate inquiry has improved,

consumers expecting price increases, if the present tin restriction plans mature. World consumption of tin plate is expanding and further heavy buying is expected to develop.

Galvanized sheets are quiet, but prices are firm. Japan has bought some small lots of heavy-gage black sheets, but the light gages are inactive.

The International Steel Cartel will meet in Paris, June 18, instead of Vienna, June 14. The International Wire Rod Cartel has been prolonged until the end of 1931.

Belgian production in April was 336,000 metric tons of pig iron, 332,000 tons of raw steel and 300,000 tons of finished steel. On March 31, there were 56 blast furnaces active.

British Increase Pig Iron Output

Blow in 11 Furnaces and Have Others Prepared But Await Lower Costs—Scrap Exports May Be Controlled

LONDON, ENGLAND, May 27.—Domestic iron and steel business has been little affected by the general election, but the recent Whitsun holidays brought some interruption. Demand for pig iron is strong and Cleveland makers are sold out until October. Since Jan. 1, Northeast Coast producers have blown in 11 blast furnaces and others are being made ready for operation when fuel and ore costs permit.

Both domestic and foreign trade in British pig iron is heavy, and makers find it difficult to keep pace with their

commitments. Pool prices are no longer a guide, as most producers have no tonnage to sell and the few merchant lots of iron still available command fully 1s. 6d. (36c.) per ton more than the minimum announced quotation. Hematite furnaces are receiving more business and have ceased to quote for delivery in June. Prices are expected to advance at any time.

Makers of semi-finished steel are active. A limited tonnage of Continental billets and sheet bars is still being used, but imports are declining. Most of the Welsh tin plate mills have

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd....	£0 18½s. to £0 19s.	\$4.48 to \$4.60
Bilbao Rubio ore*.....	1 3	6.18
Cleveland No. 1 foundry	3 11	17.21
Cleveland No. 3 foundry	3 12½	17.58
Cleveland No. 4 foundry	3 7½	16.37
Cleveland No. 4 forge..	3 7	16.25
Cleveland basic (nom.)	3 7½	16.37
East Coast mixed.....	3 13½	17.70
East Coast hematite....	3 14	17.94
Rails, 60 lb. and up....	7 15 to 8 15	37.59 to 42.43
Billets	6 7½ to 6 10	30.91 to 31.52
Ferromanganese	13 15	66.69
Ferromanganese (export)	14 0	67.90
Sheet and tin plate bars, Welsh	6 5 to 6 7½	30.31 to 30.91
Tin plate, base box....	0 18½ to 0 18¾	4.45 to 4.53
Black sheets, Japanese specifications	13 5	64.26
Ship plates	7 12½ to 8 2½	1.66 to 1.76
Boiler plates	9 0 to 10 10	1.95 to 2.27
Tees	8 2½ to 8 12½	1.76 to 1.86
Channels	7 7½ to 7 17½	1.60 to 1.71
Beams	7 2½ to 7 12½	1.55 to 1.65
Round bars, ¾ to 3 in.	7 12½ to 8 2½	1.65 to 1.76
Steel hoops	9 0 to 10 0	1.95 to 2.16
Black sheets, 24 gage..	10 5 to 10 10	2.21 to 2.27
Galv. sheets, 24 gage..	13 12½ to 13 15¾	2.94 to 2.98
Cold rolled steel strip, 20 gage (nom.).....	12 0	2.64

*Ex-ship, Tees, nominal.

Continental Prices F.O.B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 7½s. to £3 12s.	\$16.37 to \$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 12	17.45
Billets, Thomas	5 3 to 5 8	24.98 to 26.19
Sheet bars, Thomas....	5 8	26.19
Wire rods Low C., No. 5 B.W.G.....	6 5 to 6 6¼	30.31 to 30.61
Black sheets, No. 31 gage, Japanese.....	12 10	60.62
Rails, 60 lb. and heavier	6 10*	31.52
Rails, light	6 1½	29.46
Steel bars, merchant...	5 18 to 6 0	1.28 to 1.29
Steel bars, deformed...	5 17	1.27
Beams, Thomas, British standard	5 4 to 5 8	1.12 to 1.14
Channels, Thomas, American sections....	6 1	1.31
Angles, Thomas, 4-in. and larger, over ¾-in. thick	5 9	1.14
Angles, Thomas, 3-in..	6 0	1.30
Ship plates, open-hearth, inspected	7 10	1.62
Hoop and strip steel, over 6-in. base....	6 7½	1.38
Wire, plain, No. 8 gage	7 11½	1.67
Wire, galvanized, No. 8 gage	9 10½ to 9 12½	2.06 to 2.12
Wire, barbed, 4-pt. No. 12 B.W.G.....	11 19	2.58
Wire nails, base....	7 19	\$1.72 per keg
Wire nails, assortments, 1 to 6-in. keg.....	10 9	2.26

*Open-hearth steel, 7½s. (\$1.82) per ton extra.

returned to the use of their own Welsh product.

Activity in the domestic market for finished material is fair, but export business is not entirely satisfactory. A number of good export orders for plates and shapes have been secured through the steel makers' export committee, and certain tonnages have been called for by the shipyards. The capacity of plate mills, however, is large and most mills can operate only irregularly.

In foreign markets there is still keen competition from Continental mills, but the firmer tone of Continental prices has placed British makers in a more favorable position. Unfortunately, British costs have also increased, forcing an advance of about 5s. (\$1.20) per ton in domestic prices for plates and shapes.

A factor contributing to present high production costs is the scarcity of steel scrap. Prior to the recent increase in steel production some sizable tonnages of scrap were exported and now there is a shortage. Steel producers have been urging governmental control of scrap exports, and a committee has been appointed to investigate the entire scrap situation.

Belgium and Japan Buy German Brakes

HAMBURG, GERMANY, May 27.—The Belgian State Railroads have awarded a 10,000,000 m. (\$2,380,000) contract to the Kunze Knorr A. G. in Germany for automatic brakes. A trial order amounting to 3,000,000 m. (\$715,200), has been received from Japan. If the brakes are found satisfactory, further purchases for Japanese railroads, totaling 15,000,000 m. (\$3,576,000), are looked for.

Reparations Shipments Reach Record

HAMBURG, GERMANY, May 27.—April deliveries of iron and steel products on reparations account exceeded all previous records. Steel mill products totaled 7,400,000 m. (\$1,764,160), electrical machinery, 5,300,000 m. (\$1,263,520), all other machinery, 6,400,000 m. (\$1,509,760), and hardware, 2,700,000 m. (\$643,680). The value of these shipments is three times that of reparations deliveries in April, 1928. Japan received electrical and other machinery valued at 1,800,000 m. (\$427,120).

Russia Buys Plates, Sheets and Tubes in Germany

HAMBURG, GERMANY, May 27.—For delivery over the next few months, the Russian Government has placed orders with the German Mannesmann Tube Co. for 15,000 tons of steel tubes and with the Bismarckhütte A. G. for 21,000 tons of sheets and plates.

German Bolts and Rivets for Export Advanced

HAMBURG, GERMANY, May 27.—Exports of bolts and rivets are improving. Rivet quotations have advanced, and the cartel including German, Dutch, Czechoslovakian, Swedish and Norwegian makers is apparently succeeding. The base price for pan or round head rivets, 1 to 3/4 in., packed in 100 or 112-lb. gunny sacks, has advanced from £8 15s. per ton (\$1.92 per 100 lb.) to £9 10s. per ton (\$2.09 per 100 lb.) f.o.b. Antwerp, and the price for hexagonal bolts with hexagonal nuts has increased from £9 16s. per ton (\$2.16 per 100 lb.), for the base sizes, to £10 5s. per ton (\$2.26 per 100 lb.).

Dutch Railroads Buy German Cars

HAMBURG, GERMANY, May 27.—The Dutch railroads have placed an order for cars with German builders. About 600 freight cars and 100 vegetable cars have been awarded to the Hanoversche Waggonfabrik A. G., Hanover, the low bidder. The third lowest bid, submitted by an American manufacturer, was only 8 per cent high. The railroads also awarded 1100 freight cars to the Vereinigte Stahlwerke van der Zypen & Wissener Eisenhütten A. G., Cologne, at a price of 4,920,000 m. (\$1,170,960).

Cleveland Cliffs Iron Co. Deal Completed

The Cleveland Cliffs Corporation, Cleveland, has been formally organized as a holding company, following the approval by the stockholders of the Cleveland Cliffs Iron Co. of an alliance with a group headed by C. S. Eaton, who has interests in several leading independent steel companies and who is regarded as the central figure in plans that later may be developed for the merger of some of the independent steel plants.

The Cleveland Cliffs Corporation has 800,000 shares of no par common stock, half of which will be issued to present stockholders of the Cleveland Cliffs Iron Co. in exchange for their stock and half to the Eaton interests, who will deposit stock in independent

steel companies having a valuation of about \$40,000,000.

Following previously outlined plans, directors of the Cleveland Cliffs Corporation have declared a stock dividend of approximately \$50,000,000 in preferred stock and \$2,000,000 in cash. Cleveland Cliffs Iron Co. stockholders are to receive \$5 a share in cash and 1 1/4 shares of new \$5 dividend preferred stock for each share of Cleveland Cliffs common stock and exchange present common stock share for share for Cleveland Cliffs Corporation common stock.

Both the Mather and Eaton interests are represented in the new holding company. William G. Mather, president, Cleveland Cliffs Iron Co., is president of the Cleveland Cliffs Corporation; Cyrus S. Eaton, partner of Otis & Co., is vice-president; S. Livingston Mather is secretary, and C. G. Heer is treasurer. The latter two are officers of the Cleveland Cliffs Iron Co. The board of directors consists of Samuel Mather of Pickands, Mather & Co.; William G. Mather; S. Livingston Mather; E. B. Green, chairman executive committee Cleveland Trust Co.; C. S. Eaton; W. R. Burwell, president Continental Shares, Inc.; Richard Inglis, partner of Otis & Co., and Thomas H. White, president, Commonwealth Securities Co.

Chicago Structural Workers Gain \$1 a Day Increase

The strike of Chicago's structural and architectural iron workers was ended June 6, when the joint conference board representing the unions and the employers signed a new wage contract calling for \$1 a day increase, or \$13 a day. The scale is to become effective immediately and to remain in effect for a period of one year.

Heavy Movement of Steel Scrap to Italy

More than 100,000 tons of heavy melting scrap and similar material has moved in the last six months out of Galveston and Houston, Tex., for consumption in Italy. The price paid is \$19 a gross ton, delivered Italy. This movement is still under way and firm offers are still to be had at the above figure.

Production and Shipment of Raw Materials and Finished Products in April

	April, 1929	March, 1929	April, 1928
By-product coke (a) net tons.....	4,456,944	4,613,075	3,925,195
By-product, daily average.....	148,565	148,809	130,840
By-product, stocks at producers' plants (b).....	1,339,371	1,212,562	1,708,967
Enameled sheet-metal ware: (c)			
Shipments, dozens.....	463,577	449,425	351,034
value.....	\$1,420,535	\$1,513,040	\$1,327,929
Galvanized sheet-metal ware: (c)			
Shipments, dozens.....	227,354	261,065	237,571
value.....	\$882,608	\$920,567	\$875,442

(a) United States Bureau of Mines.

(b) First of following month.

(c) United States Department of Commerce.

This Issue in Brief

Reduces amount of working capital tied up in work in process 20 or 30 per cent by studying material control and handling. Automobile manufacturer expects to make a further reduction. Calls inventory question the "sore spot in industry."—Page 1637.

* * *

Core troubles in steel foundry considerably reduced by changing baking oven over to gas-firing. Use of trucks as baffles results in exceptionally uniform heat distribution. Production of good cores has increased 28.7 per cent, and \$10,000 a year is saved in fuel.—Page 1634.

* * *

If steel is to be cold-sheared, it should be annealed by the steel maker. However, many buyers object to paying the necessary extra to cover annealing costs. Hence mills are doing everything possible to effect slow cooling after rolling, so that annealing may be avoided; but this impedes production.—Page 1639.

* * *

Heat treaters can minimize heat losses more economically by use of insulation than by using very thick walls. An 18-in. fire-brick wall, insulated with a 4-in. thickness of high-grade insulation, will transmit less heat than a solid refractory wall 60 in. thick.—Page 1642.

* * *

New high record for steel ingot output established in May. Average daily production was 195,302 gross tons, exceeding the previous record month—March, 1929—by 354 tons a day.—Page 1652.

* * *

Saves 50 per cent of floor space by using double-deck hardening furnaces. Roller-hearth electric furnaces have two chambers, mounted one above the other. Operator can feed both chambers without changing his position.—Page 1628.

Better steel may result from study of slag characteristics. Very little has been done in the past 40 years to improve the quality of the slag. Cleanliness of metal is controlled more by the physical than by the chemical properties of the slag. Much is expected of slag studies now being conducted.—Page 1636.

* * *

Bases manufacturing schedule on sales forecast released 90 days in advance. After monthly schedule is prepared, daily schedules are then planned, and the materials handling system resolves itself into the problem of supplying materials in necessary quantities.—Page 1637.

* * *

Cast steel chain said to be stronger than welded chain. Anchor chain 2.36 in. in diameter withstands load of 200 tons without breaking. The stud is cast together with the link, and in one piece with it.—Page 1632.

* * *

Only three days' supply of material ahead of production demands. This necessitates a close follow-up of over 7000 different parts, and close cooperation between material-planning department, purchasing department and traffic department, to assure uninterrupted supply of material.—Page 1637.

* * *

Forging makers will find it cheaper in the long run to use select forging steels rather than commercial steels, for parts calling for rigid chemical limits or uniform physical results after heat treatment, says steel maker. Commercial steel varies more in chemical composition, and is made from ingots cropped only to extent of removing visible pipe.—Page 1640.

Cracks in steel castings may be prevented by using heated molds and molding materials which are poor conductors of heat. Increased temperature of the molten metal would help, also. These measures would keep the metal fluid in the mold for a longer time, permitting the escape of gases.—Page 1641.

* * *

Cost of new bridge may be cut by use of new structural material. Medium-manganese steel (1.80 per cent maximum manganese) with ultimate strength of 90,000 lb. per sq. in. would reduce deadweight of planned Kill van Kull structure, and cost less than nickel steel.—Page 1643.

* * *

Decimal gage system for metal products favored by purchasing agents' association. This would eliminate the confusion resulting from the use of a large number of gage systems.—Page 1649.

* * *

Quenched parts are cleaned automatically. Parts carried through quenching tank on a conveyor are then hung on an overhead conveyor, taking them through washing machines. After washing they are cleaned with revolving wire brushes.—Page 1628.

* * *

Don't cold shear billets that have been exposed to cold weather, without first taking the chill out of them, or cracking will result. Billets should be warmed at room temperature before shearing.—Page 1640.

* * *

Copper-alloy steel castings used in electric revolving shovel construction. They are of special analysis and have an ultimate strength of 90,000 to 105,000 lb., and an elastic limit of 60,000 to 78,000 lb. to the sq. in.—Page 1630.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Business Outlook

PREDICTIONS of a falling off in industrial activity have been more frequent of late, some of them apparently relating themselves to the liquidation in securities which came in the last week in May. It may be recalled that the severe stock market break of February, 1926, brought similar predictions—more pronounced, indeed, than any now current. Yet 1926 saw no adverse effects upon general business, the volume of the year being highly satisfactory. Similarly, one year ago, in the liquidation and decline of securities, the process was largely one of house-cleaning in the stock market itself, industrial activity in the summer months being maintained at an unusual rate, with further expansion in the final quarter.

The production of commodities continues today at a high rate throughout the country. Operation of steel works is nearly at 100 per cent capacity. Car loadings are at a high-water mark. There is no unemployment of labor except that which is voluntary and that which exists in a few ill-favored industries that have long been suffering from evils peculiar to themselves. We might go further and say that practically all the economic indications, physically speaking, are good. At the same time we may question whether these are not reflecting the consummation of past contracts rather than forecasting the future. Undoubtedly there have been some untoward developments whose effects we must soon begin to feel.

Meddling with credit conditions may have some unforeseen consequences, just as does any meddling.

The decline in the stock market extinguishes the liquidation of profits some of which have been used in buying goods, just as a part has been handed over to the tax-gatherers.

The tax-gatherers themselves may anticipate a leaner year, and therefore there may be less ability for spending by State and other authorities.

The decline in the price of wheat portends curtailment of buying by the wheat-growers. At the same time wheat is not all of agriculture.

The recent advance in terms for union labor will be a deterrent upon building operations.

The raising of many tariffs on foreign goods at this time would not be favorable to our export trade. A profitable foreign trade must be mutual. We may remind ourselves that our great export trade in recent years has been largely based on the credits we have extended to Europe—an international system that is incapable of indefinite prolongation.

At the moment it would seem that conditions are working toward what will be only a halt in our domestic business, or at most a minor recession; but we must recognize some factors that have possibilities of harm. The doctrine now being proposed that

central banks, including our own, shall be guided in their discount policy by the general level of commodity prices and by that only, has its dangers, as Dr. B. N. Anderson has lucidly explained in a recent bulletin of the Chase Bank.

Marvelous Output of Steel

THERE is no ground from which the steel production since July 1, 1928, can be viewed that does not show it to have been remarkably heavy. One might say phenomenally heavy were it not that performances in the old days made departures from the average quite familiar.

Appearance of the ingot production figures for last month makes possible a close approximation of the total output in the year ending with June. The daily rate made a new high record in May, open-hearth steel having a small decrease from March and Bessemer a slightly greater increase in tonnage, representing a large proportionate increase. For comparison with other years one may assume June at the May rate, and add an allowance for electric and crucible ingots, a trifle under 1 per cent, to the reported Bessemer and open-hearth production. Finally, adding the working day the calendar took from the second half of last year, total steel ingot production in the 311 working days through this month comes out at 54,650,000 tons. This is the period to be taken for comparison with other periods, since the second half of last year was exceptionally heavy, passing the first half, whereas usually there is a decrease.

Production of 54,650,000 tons of steel ingots in the 12-month period now ending compares with 46,936,205 tons in the calendar year 1926 and with approximately the same tonnage in the 12 months through June, 1927. The calendar year 1928 need not be considered since it contained one-half the period now being measured.

From 1923, which was a good year, to 1926, also a good year, production increased 8.0 per cent, or at 2.7 per cent a year. The same increase continued for 2½ years would have resulted in 50,000,000 tons for the year now ending, but we have 9.3 per cent more than that. This is the comparison that shows the least excess. If we take high first halves of years we compare the first half of 1923 and the first half of 1928 and project the rate of increase. Production in the present half year is 16 per cent above such expectation.

Both the foregoing comparisons are made by taking high spots in the curve of production for projecting into the present period. That tacitly assumes that the present period is an exceptional one, just as those other periods stood out in the general graph. If, however, we follow a course often pursued and construct

a trend line by using production by half years Jan. 1, 1923, to July 1, 1928, we find the present half year 22 per cent above the general trend line. This greater excess arises from the fact that the trend line is pulled down by the low production in 1924 and in the second half of 1927.

It must be admitted that we are in an exceptional period as to steel production. To call a period exceptional is not to suggest anything as to its probable length. This period, now completing its twelfth month, began just after interest rates began to rise, gradually attracting more and more attention. Certainly there is more than a hint here that there was a connection some people have been disposed to overlook—a demand for steel and a demand for capital. Both have exceeded expectations.

Value of an Organization

IT has occurred frequently that a manufacturer has taken from another manufacturer an apparently successful employee, only to find that the man does not "make good" in his new position. The general reason in such cases is that the man does not function so well in his new environment. A particular and common reason for this has been that in his previous connection he was aided by an organization which did not exist in the place to which he went. No fault is to be found with the individual unless he had misrepresented things to his prospective employers. Rather, those who sought his services erred in attributing too much of the man's previous success to his own ability.

One cannot get an organization by hiring individuals, unless perhaps he hires them for organizing ability, and that is more than is usually done. Organization must be promoted by those highest up. An old and still familiar illustration is the organization formed by Andrew Carnegie, who had a special gift in discerning what kind of work an individual could best do. Of course, he needed to know much more than that, the first essential being to know precisely what work it is desirable to do. Without disparaging the individuals Mr. Carnegie put together, probably none of them would have functioned elsewhere as well as he did in the Carnegie organization. There was no practical test of this, however, for Mr. Carnegie saw to it that none of those whom he needed could be tempted by any offer of employment elsewhere.

As business grows more complex the need for organization and the good resulting from it increase. For centuries science as a whole has been progressing by the same principle. An all-around man like Aristotle long ago became inefficient and impossible. Scientists must specialize and the progress in each branch is aided by other branches.

The principle is working more and more year by year in industry. In general the larger companies have the best organizations. That is a rule that works both ways. A company would not grow large or stay large if it did not have organization, while its largeness enables it to narrow the work of each man so that the individual can go farther along his particular line. In that respect it is not so much a matter of employing high-class individuals as of providing means whereby the individuals can do high-class work. The onlooker may think the individual himself has accom-

plished certain important results, whereas he may have been simply the chief worker, being greatly aided by various other departments in the organization.

By securing such a man the new employer may not even be getting the stock of information he expects. The man may have been utilizing certain conclusions supplied by other parts of the organization to which he belonged, without knowing how those conclusions had been reached or being fortified to reach corresponding conclusions when new problems were presented.

It is an entirely different case when a business concern decides to improve its organization and seeks individuals capable of filling the particular jobs outlined for the improved set-up. In other words, to repeat, organization must proceed from the top downward. The pieces cannot be expected, of their own initiative and skill, to form themselves into an organization.

For Less Defiance

OUR daily newspaper headliners need to reform altogether their treatment of that sadly misused word "defy." Does a manufacturer find that he cannot grant a wage advance asked by his employees; the headline of the next morning tells the world that he has defied them. The majority of a committee of the House or Senate at Washington may have only differed from the President in its view of a pending question. But by that token it has defied him. In a New York daily newspaper, in the past week, we were told in headlines that the Pennsylvania Railroad had defied the Interstate Commerce Commission "trust" order, simply because it planned to appeal to the Federal courts from the commission's decision that it divest itself of its Wabash and Lehigh Valley stock holdings. In the same issue of the same paper the talking motion picture producers were painted as defiers of the Actors' Equity Association because they had not accepted the Equity's view that its members might not engage in sound or talking pictures except under standard Equity contracts. We are not objecting to this headliner habit in the interest of purist writing. We simply call attention to the responsibility of the daily press for a practice that so often, especially in labor matters, exaggerates a difference of opinion into a state of war and makes the normal attitude of various elements in our modern life that of flying at each other's throats.

Germany's Reparations Bill

THE agreement among Germany and the Allies on the reparation payments to be made by the former, reached after many weeks of discussion, during which many times there were feelings of despair, is a subject of world-wide importance and congratulation. All business forecasts emphasize its favorable implications. Great credit is due to the American delegates—Messrs. Young, Morgan and Lamont—for their wisdom, diplomacy and patience in aiding to this result. There was at the last a powerful appeal to the dramatic sense in the commitment by Mr. Morgan of his house to the American share in the international bank, when official sanction would not, or could not, be given to participation by our Federal Reserve banks.

If we understand the settlement correctly the Germans have to pay about two billion marks a year for a period of 37 years, which figures to a present value of about 33 billion marks; then a diminishing rate for another 21 years. These sums, huge as they look, are far below the original claims made against Germany, and are undoubtedly well within the German capacity for paying, disagreeable though that may be to the vanquished. Germany's tax levy for military purposes alone in the period just before the great war was a billion marks a year.

Dr. Helfferich, a German economist and authority on finance, estimated the aggregate savings of all kinds in Germany just before the war at 8 to 8.5 billion marks a year. In view of the depreciation of gold since then such a figure would correspond to 11.5 to 12 billion marks a year now.

It is estimated that the savings of the German people in 1927 were about 9 billion marks, exclusive of payments on reparations account, which if considered as savings would bring the total almost up to Dr. Helfferich's pre-war estimate. In making comparisons it must, of course, be remembered that the population and industrial plants of Germany have been diminished by losses of the territories trimmed off at Versailles, especially Upper Silesia. Also may it be remarked that what Germany now has to pay in reparations is perhaps not greatly beyond what the reich would be spending on military equipment if it were permitted to have it.

Recent American visitors to Germany have been unanimous in their reports of the appearances of prosperity and the optimistic attitude of the people, who are clearly happier for having rid themselves of an insolent military aristocracy. In their industrial affairs the Germans are ambitious, enterprising and scientific, with a thorough understanding of American methods and a desire to emulate them so far as their conditions permit.

CORRESPONDENCE

A Brick-Mason Contractor on the Bricklayer's Performance

To the Editor:—As a bricklayer and an employer of bricklayers, I would like to give a few facts, not fallacies, concerning the business I think I know. You say in your editorial on "The Art and Snares of Bricklaying" that 25 years ago a bricklayer laid 1200 brick per day on a 12-inch wall. Today we figure the same. Veneered walls, the most expensive type of work, run \$30 to \$38 per thousand; not \$50 or \$60. While it is conceivable that some particular job may cost about that price, it is not a fair price to quote. Most of my work is in the steel mills, building furnaces, etc., and although at times I have to absorb traveling and operating expenses on out-of-town jobs, yet the price per thousand is generally under \$30.

You are practically correct about the competent and the indifferent bricklayer receiving the same rate of wages; but the indifferent bricklayer, known in the trade as a "boot," like the "dub" engineer, draftsman, lawyer or surgeon, is generally out of work. The competent bricklayer loses about 25 per cent of the possible working days due to weather conditions, waiting on other trades, etc., while the "boot" gets only a few weeks when building is at its peak.

Finally, the bricklayer exists about the same as any

other working man in this country. If he is industrious and competent the chances are he is buying his own home (on instalments sometimes hard to meet), goes to work in a cheap second-hand car and is what is considered one of the best types of American workers. He is not a member of a monopolistic guild system and probably would not know what is meant by a monopolistic guild system. He is a member of a union, generally intelligently and constructively operated by men who are trying to elevate the standard of living for themselves and other American workers. There are no restrictions on the number of brick to be laid by a man per day, nor against the use of improved methods or machinery.

JOHN J. KERNAN,
Brick-Mason Contractor.

Pittsburgh, June 3.

[Pittsburgh is on the geographical frontier of unionism, so to speak; that is, some building in that territory is done with union labor and some with non-union, and therefore there are competitive conditions. Many persons who have to build on the seaboard wish they could enjoy similar conditions.—EDITOR.]

Tungsten Carbide Tools and Light Finishing Cuts

To the Editor:—We have just read your editorial on page 1592 of the June 6 issue of THE IRON AGE, in which you discuss the adaptability of tungsten carbide tools for various machining operations.

In the next to the last paragraph you make the statement that these tools are not adapted to work requiring the smoothest finish. We wish to take exception to this statement, as we have found that Widia tools are particularly efficient on light finishing cuts where a fine finish is required. An excellent finish which very nearly approaches a polished surface can readily be obtained at high cutting speeds, provided that the tool itself has been properly ground to a keen, smooth cutting edge.

K. B. SPAULDING,
Sales manager, Wesson Sales Co.

Detroit, June 7.

Magnesia Linings Now Used for High-Frequency Furnaces

To the Editor: We notice on page 1145 of THE IRON AGE, April 25, a note about furnace linings used at Edgar Allen & Co., Ltd. Your text states that 35 heats can be melted. The implication is that this lining life is better than had been attained previously, and the silica or quartz lining is compared with plumbago crucibles.

As a matter of fact, we gave up using plumbago crucibles in most of our steel melting furnaces a year or more ago, and have since been using linings made in the following manner:

A magnesia crucible or shell is placed in the furnace, and granular magnesia with 1 per cent boric acid is rammed between the shell and the coil. After the shell has been eroded by melting, the magnesia has become sintered sufficiently to stand up, and we have therefore a practically pure magnesia lining. Such linings have often lasted between 100 and 200 heats, and there is a record in one case of more than 400 heats when melting nickel-chromium alloys.

We do not want it to be generally thought that our linings are limited to 35 heats. We expect with larger furnaces to have the extended lining life which steel men ordinarily associate with arc furnace linings. On account of our ability to put the heat in the metal instead of above it as in the arc type furnace, there is good reason to believe that coreless induction furnace linings will last even longer than arc furnace linings.

DUDLEY WILLCOX,
Treasurer and assistant general manager,
Ajax Electrothermic Corporation.

Trenton, N. J.
May 31.

Trade Customs in Making Iron Castings

Standard Sales Agreement Adopted and Accepted Practices Promulgated by Gray Iron Institute

THE Gray Iron Institute, Terminal Tower Building, Cleveland, has adopted a standard sales agreement and trade customs for the gray iron industry. This was prepared by the merchandising committee and was approved by the board of directors. This standard agreement is as follows:

All quotations are made and all castings are sold upon the following terms and conditions:

1. Unless otherwise agreed, quotations must be accepted and patterns furnished the foundry within 30 days from date of quotation.
2. All castings are sold as rough castings, f.o.b. cars, foundry point. Terms—30 days net, from invoice date, unless otherwise stated.
3. Claims for error in weight or number must be made within 5 days after the receipt of castings.
4. Foundry is responsible only to the extent of replacing castings rejected due to foundry defects and such castings must be reported or returned to the maker within 90 days after their receipt.
5. Foundry is not responsible for machine work, labor charges or other losses or damages caused by defective castings.
6. Foundry is not responsible for loss of

or damage to patterns by fire or other casualties beyond its control.

7. Foundry shall not be liable in damages for failure to deliver as a result of fires, strikes, differences with employees, accidents or other causes beyond its control.

A compilation of this matter, including generally accepted trade customs which meet the approval of the institute, has been made in a leaflet for general distribution. In respect to quotations, these trade customs are as follows:

Quotations:

1. Blue prints submitted for estimating purposes should be marked with rough casting weight, if known, or an estimated weight upon which quotation will be based. A detailed description of the pattern equipment should be furnished.
2. When quotations involve the making of piece prices, definite weights shall be established and agreed upon, and quotations shall be subject to revision on any variation from the established weights.
3. Unless otherwise specified by the foundry, quotations are based on castings with gates, fins and other projections removed to approximately the contour of the pattern.

Loss in Steel Corporation's Orders in May

After five successive monthly increases, there was a decrease in the unfilled orders on the books of the United States Steel Corporation at the end of May. This decrease was 123,596 tons. A year ago the decrease in May was 455,311 tons. The table gives the data for the last 17 months.

		1929	1928
Jan.	31.....	4,109,487	4,275,947
Feb.	28.....	4,144,341	4,398,189
Mar.	31.....	4,410,718	4,335,206
Apr.	30.....	4,427,763	3,872,133
May	31.....	4,304,167	3,416,822
June	30.....		3,637,009
July	31.....		3,570,927
Aug.	31.....		3,624,043
Sept.	30.....		3,698,368
Oct.	31.....		3,751,030
Nov.	30.....		3,673,000
Dec.	31.....		3,976,712

Bids on Light Cruisers Is Postponed to June 15

WASHINGTON, June 11.—The Navy Department has postponed the opening of bids and estimates for the construction of five light cruisers to Saturday of this week. Two of the ships will be constructed in private yards and three will be built in Navy yards. The reason assigned for the postponement was to give the Boston yard

time to prepare estimates and to revise the form of bids to be asked of private yards. Denial has been made of the report that the postponement was due to efforts of the administration to reach an agreement with other nations regarding naval reduction, although in some quarters the report appears to be credited.

Power Transmission Men Meet in Boston

New England members of the Power Transmission Association held their first meeting at the Chamber of Commerce, Boston, June 7. W. H. Fisher, president, outlined the objectives of the association, and F. H. Willard, vice-president, who served as toastmaster, also gave interesting facts regarding the organization.

Following Mr. Fisher, M. C. Sargent, vice-president Bellamy-McKim Co., Boston, discussed the distributor's position in distribution of transmission equipment, and Prof. F. R. Sweet, Massachusetts Institute of Technology, gave what, in his opinion, should constitute the belting engineer's handbook. The final formal address was on short-center drives, by S. E. Frost, Bird & Sons, East Walpole, Mass.

Numerous experiences of power

users in installation and maintenance of belting and transmission equipment were given in open forum, led by Leon Bellamy, Bellamy-McKim Co., and Frank H. Rudy, Monson Maine Slate Co. Some of the addresses were illustrated by moving pictures. W. S. Hays, executive secretary of the association, attended the meeting.

Steel Corporation Answers Bethlehem Suit

The answer of the United States Steel Corporation to the patent infringement suit started recently by the Bethlehem Steel Corporation was filed last week in Newark, N. J. Bethlehem alleged infringement of patents covering the manufacture of steel beams. The Steel Corporation contends that because Bethlehem waited from March 23, 1904, to April 4, 1929, to bring suit it has lost its right to institute an action.

Lackawanna Will Electrify 173 Miles of Track

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, is perfecting plans for electrification of its suburban lines from Hoboken to Dover and Montclair, N. J., and from Summit to Gladstone, totaling 173 miles of track. Bids will be received by C. C. Hubbell, purchasing agent, until June 24 for steel structures for catenary supports, totaling about 4000 tons. Bids will soon be asked for other steel work and for power equipment for substations at Bergen Junction, Newark, Summit, Bernardsville and Den-ville.

The Lackawanna is also planning early construction of a new engine house at Jersey City, N. J., with repair facilities.

Factory Wages High

Average weekly factory wages in New York State are reported by the State Industrial Commissioner at \$30.07 for April. This shows a drop of 28c. from the \$30.35 reported for March, which was the highest on record. These two figures may be compared with \$28.79 for April, 1928.

Bar Iron Scale Renewed

The Western Bar Iron Association has renewed its present agreement with workers, covering wages and working conditions for the 12 months beginning June 30, following conferences at Atlantic City.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: June 20—Position of Iron and Steel Producers; July 4—Activity in Steel Consuming Industries.

Iron and Steel Markets

Ingot Output Still at High Rate

June Production Likely to Rank With That of Three Preceding Months—Record Structural Awards—Pig Iron Weakens on Aggressive Selling

STEEL production shows little reduction from the record-breaking rate of May. Having become accustomed to performances in excess of expectations, the trade will not be surprised if the total output for June, allowing for the shorter working period, closely approaches the high average for the three preceding months.

Specifications from the automobile industry continue to show a decline, but the extent of the reduction has been less than had been looked for. Rail orders are approaching completion, although because of the pressure for the other materials they will occupy the mills longer than usual—in the case of one Chicago producer until early August. Tin plate is also feeling the effects of seasonal influences and standard pipe reflects the recession in general building activity, particularly residential construction.

Mill backlogs, however, are unusually large and little decline in production can be expected until deliveries improve materially. Unfilled orders showed only a small reduction in May, that of the Steel Corporation, 123,600 tons, comparing with over 455,000 tons one year previous.

Lest too much emphasis be given to evidences of reduced pressure on the mills, it should be noted that demand from many consuming groups is still buoyant. Construction work taking structural steel continues in large volume. Fabricated steel lettings, at 88,000 tons, have established a new weekly record. Included in the total were 34,000 tons for New York subways and 8000 tons for a Russian tractor plant.

Railroad equipment buying is featured by the largest locomotive order in years—150 engines for the New York Central—calling for fully 7500 tons of plates alone. While the week was a small one in car orders, freight equipment builders are well booked. Freight cars placed by domestic railroads in the first five months of this year numbered 55,500, compared with a total of 49,950 for all of 1928.

Pittsburgh district builders of river barges are heavily engaged, and agricultural implement makers are taking steel at an unchanged rate, notwithstanding that their inventory period is well advanced. However, seasonal changes in the type of farm equipment to be manufactured may result in a short interruption in specifications for material.

Large commitments in line pipe may be augmented by the placing of 200 miles of pipe by the Anaconda Copper Mining Co. for a line from a Wyoming gas field to its Montana works.

The excellent situation among machine tool manufacturers is significant not merely in terms of materials required, but also as an index of the high rate of industrial activity in general. Unfilled orders of

members of the National Machine Tool Builders' Association reached a new monthly record in May.

Chicago mills have not yet been able to improve their deliveries, which for plates and bars range from 12 to 14 weeks. Overflow tonnage from that district continues to reach mills farther East. At Pittsburgh, specifications in the heavier rolled products are virtually as large as in the closing week of May.

A surprising number of buyers are taking in full the remaining tonnage on their second quarter contracts, although the sole inducement is to get satisfactory shipments. Since existing prices have been reaffirmed for third quarter, reasons for specifying in excess of known requirements are lacking. Such contracts as have been placed for the coming three-month period have frequently called for as much steel as was used in the expiring quarter.

Contracts for black sheets have been closed by large buyers in the automotive field at 2.85c., Pittsburgh, which is the same price at which considerable large-lot business was taken for the second quarter, although \$2 a ton below the quotation now adhered to by some mills.

The inability of finishing mills to pass on increased costs to consumers makes it doubtful whether present prices on semi-finished material will be insisted on in third quarter contracts with non-integrated producers.

The pig iron requirements of steel makers are unabated. A Pittsburgh district company has closed for a large tonnage of basic to supplement its own production, and the Carnegie Steel Co. has lighted another blast furnace in its Duquesne group. Blast furnace operations in the Pittsburgh area are at the highest point since the war.

Foundries, however, are slow in covering for their third quarter needs. Melt, although still high in the North and East, shows a downward trend, and some second quarter tonnage will be carried over into the next period. Aggressive selling on the part of Alabama producers has resulted in the placing of trial orders for about 3500 tons of basic by Atlantic seaboard steel works and the naming of a delivered price figuring back to \$14, Birmingham, or \$1 a ton below the recent minimum. Buffalo foundry iron for delivery in the East has broken 50c. a ton to \$17.50, furnace.

Heavy melting scrap at Pittsburgh is unchanged, but a stronger market is reflected in advances in other grades of old material. Heavy melting steel has declined 25c. a ton at Chicago and Cleveland.

THE IRON AGE composite price for pig iron has declined to \$18.63 a ton from \$18.71, the peak thus far this year. Finished steel is unchanged at 2.412c. a lb. for the eleventh week.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
No. 2 foundry, Philadelphia..	\$21.76	\$21.76	\$21.76	\$20.76
No. 2, Valley furnace.....	18.50	18.50	18.59	16.75
No. 2 Southern, Cin'ti.....	18.69	18.69	18.69	19.69
No. 2, Birmingham.....	15.00	15.00	15.00	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa.....	20.25	20.25	20.25	19.00
Basic, Valley furnace.....	18.50	18.50	18.50	15.35
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	18.76
Malleable, Chicago*.....	20.00	20.00	20.00	18.00
Malleable, Valley.....	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh.....	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	105.00	105.00	105.00	105.00

Rails, Billets, Etc., Per Gross Ton:	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	36.00	36.00	36.00	32.00
Sheet bars, Pittsburgh.....	36.00	36.00	36.00	33.00
Slabs, Pittsburgh.....	36.00	36.00	36.00	32.00
Forging billets, Pittsburgh....	41.00	41.00	41.00	38.00
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.85	1.85	1.85	1.85

Finished Steel,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.95	1.95	1.95	1.85
Bars, Chicago.....	2.05	2.05	2.05	2.00
Bars, Cleveland.....	1.95	1.95	1.95	1.85
Bars, New York.....	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh.....	1.95	1.95	1.95	1.85
Tank plates, Chicago.....	2.05	2.05	2.05	2.00
Tank plates, New York.....	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago...	2.05	2.05	2.05	2.00
Structural shapes, New York...	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh..	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh.	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago	3.05	3.05	3.05	2.80
dist. mill.....	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, P'gh...	3.80	3.80	3.80	3.70
Sheets, galv., No. 24, Chicago	2.35	2.35	2.20	2.10
dist. mill.....	2.45	2.45	2.40	2.20
Wire nails, Pittsburgh.....	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill.	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh.....	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill.	2.55	2.55	2.55	2.55
Barbed wire, galv., Pittsburgh	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago	3.35	3.35	3.35	3.40
dist. mill.....	5.35	5.35	5.35	5.25
Tin plate, 100 lb. box, P'gh...				

Old Material, Per Gross Ton:	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Heavy melting steel, P'gh....	\$18.25	\$18.25	\$17.75	\$14.75
Heavy melting steel, Phila...	16.00	16.00	16.50	13.50
Heavy melting steel, Ch'go...	15.00	15.00	15.50	12.75
Carwheels, Chicago.....	14.25	14.50	14.50	13.00
Carwheels, Philadelphia.....	16.00	16.00	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.00	15.00	14.25
No. 1 cast, Philadelphia.....	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)...	15.00	15.00	15.50	14.00
No. 1 RR wrot., Phila.....	16.00	16.00	16.00	13.50
No. 1 RR wrot., Ch'go (net)...	13.50	14.00	14.00	11.50

Coke, Connellsville,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.60
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	18.12½	18.12½	18.12½	14.87½
Electrolytic copper, refinery..	17.75	17.75	17.75	14.50
Tin (Straits), New York.....	44.50	43.62½	44.25	48.62½
Zinc, East St. Louis.....	6.65	6.55	6.67½	6.15
Zinc, New York.....	7.00	6.90	7.02½	6.50
Lead, St. Louis.....	6.80	6.80	6.75	6.15
Lead, New York.....	7.00	7.00	7.00	6.30
Antimony (Asiatic), N. Y. ..	9.00	8.87½	9.00	9.75

Pittsburgh

Slackening in Specifications Fails to Affect Steel Plant Operations—Large June Output Assured

PITTSBURGH, June 11.—Steel production in this and nearby districts is not yet showing the effects of the gradual tapering off in specifications. However, it is now generally admitted that the high rate of finishing mill operations in some departments is being maintained at the expense of backlogs. Reports of falling off in automobile requirements have been overemphasized in view of the fact that the two leading makers of cars in the low-priced field have not reduced their production schedules, but makers of alloy steel bars, strip steel and sheets have experienced a slight decline in the volume of their tonnage releases. Other large consuming lines are holding up well.

Pittsburgh district mills report no curtailment in the demands of agricultural implement makers, and movement of steel to manufacturers of automobile parts and accessories seems to be undiminished in spite of declining automobile production. Barge builders in the district have enough business to keep them running at capacity for two or three months and railroad car shops are equally well occupied. Makers of railroad equipment other than cars are also very busy, although the peak of activity in rails and track accessories has now passed.

Among the products which are dragging are tin plate and standard pipe, the former because of uncertainty in crop conditions, and the latter on account of reduced building activity and the failure of construction to get under way in the face of unfavorable weather conditions.

Makers of the heavy hot-rolled products have now opened their books for third quarter at 1.95c. Pittsburgh, for bars, shapes and plates. This leaves prices unchanged on all the ordinary finished steel products except blue annealed sheets. If present quotations are adhered to, some custom-

ers, who were able to cover their second quarter requirements before present prices were made effective, will have to pay more for their steel in the third quarter than they are now paying.

Semi-finished steel prices have not yet been named by leading producers in this district, although non-integrated makers are anxious to cover their requirements. Steel companies are not yet actively seeking third quarter business, but on some products, notably plates and sheets, consumers are anxious to place future orders. In most cases there is little reduction in the total tonnage anticipated, and this tendency is considered a favorable augury of late summer and fall activity.

Open-hearth operations are keeping up well, and June is expected to be another very large month in this district. Pig iron production is also unchecked. The Carnegie Steel Co. has added another stack in the Duquesne group and now has all six in operation at that point. Furnace operations in the district as a whole are at the highest point since the war period. Merchant iron output is also high, but iron is moving rapidly into consumption and yard accumulations are small.

New buying, however, is light and pig iron consumers are not yet showing any particular interest in third quarter requirements.

The scrap market has a stronger undertone. Heavy melting steel is still quotable at \$18 to \$18.50, but several other grades have advanced.

Semi-Finished Steel.—Unfinished steel is still far from plentiful in the Pittsburgh and nearby districts, but slight curtailment of rolling mill operations in some departments has released tonnage for other products where the pressure for deliveries is unabated. As a result, the supply of crude steel is now much better adapted to demand than it was a month or six weeks ago, though the total output is practically unchanged. The present operating rate of open-hearth furnaces will certainly continue throughout June and the early part of July, and until that time the present close margin between supply and demand will likely show little change. Reserve supplies of billets and slabs, ordinarily sufficient for three or four weeks' operations, have now been reduced to a low point, and while it is unlikely that reserves of the former size will again be accumulated quickly, they will gradually be built up in periods of light activity. Non-integrated mills have not yet contracted for their third quarter requirements, and makers of semi-finished steel who sell a large part of their output seem reluctant to name prices for that period. Companies which sell only a small part of their crude steel are generally in favor of maintaining as high a price as possible on billets, slabs and sheet bars to give strength to the market on finished products. On the other hand, mills selling a good part of their tonnage to outside companies are reluctant to name higher prices to customers who cannot now pass on the advance to the consumers of their finished products. In view of this situation, it is possible that third quarter contracts may be placed at the second quarter quotations of \$34 a ton, Pittsburgh or Youngstown, for billets and slabs and \$35 for sheet bars, while the present price of \$36 will be named again for spot tonnages.

Pig Iron.—Evidences of a third-quarter buying movement are not yet marked in this district. Shipments of iron on old contracts are holding up well, but in new business the market is rather quiet. The Westinghouse Electric & Mfg. Co. is inquiring for a round tonnage of foundry iron for its Cleveland plant, and an unnamed consumer is asking for prices on 3000 tons for third quarter delivery. Nevertheless, definite inquiry is scarce, and there seems to be a growing tendency on the part of large buyers to cover their needs quietly without issuing a general inquiry. During the last week a steel company in the greater Pittsburgh district, not ordinarily a buyer of iron, is said to have closed on a large tonnage of basic to supplement its own production, and another steel company in the immediate Pittsburgh area is also said to be about to close for third quarter. Merchant stocks in the Valley district are unusually low, and, with the exception of radiator and sanitary ware makers, foundries will not carry much of their contract tonnage for this period into the third quarter. Considerable iron is expected to be bought in the next two weeks, as steel foundries and other consumers will be very active during the summer months. The price structure is unchanged. Small tonnages are regularly commanding \$18.50, Valley, for basic and foundry iron, and \$19 for malleable and Bessemer. The Pittsburgh district furnace is quoting f.o.b. prices 50c. a ton over this figure for delivery to Allegheny County points.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free.....	27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	\$19.00
No. 2 foundry.....	19.00
No. 3 foundry.....	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Bars, Shapes and Plates.—Leading makers have opened their books for third quarter at unchanged prices, or

1.95c., Pittsburgh, for bars, shapes and plates. This represents an advance of \$1 a ton over the second quarter price to some buyers, and as usual at the beginning of a quarter there is considerable talk in favor of forcing small users who do not cover their requirements by contracts to pay a \$2 premium. This price is obtained at present only in isolated cases where the tonnage is small and the specifications difficult. With unchanged prices, the end of the quarter is not expected to develop any particular rush of specifications, and the well-filled condition of mill order books has made producers indifferent in the matter of inducing customers to hasten their third quarter contracts. Shipments are being maintained at recent levels and the first two weeks of June have brought little, if any, falling off in tonnage releases against contracts. Delivery promises on bars and shapes average about four weeks and twice that time is required for plate shipments. Sizable structural tonnages placed in the last week include 1900 tons for a Pennsylvania Railroad freight shed in Pittsburgh and 550 tons for a factory building for the Standard Steel Propeller Co. at West Homestead, Pa. The Midland Barge Co. has taken five scows for New York State canal service, which will call for 400 tons of plates, and bids will be opened on June 17 at Cincinnati for several Ohio River barges. Barge builders in the Pittsburgh district are so well supplied with orders that they are not competing actively for miscellaneous business coming out at this time. Railroad car shops are taking steel at an undiminished rate and are now operating at practical capacity for the first time in two or three years.

Alloy Steel Bars.—Leading makers of round cornered square alloy steel bars have announced that after July 1 bars of this type under 4 in. in diameter will be sold on the same basis as carbon steel bars, with full extras applying, instead of on the billet basis, as in the past. This will represent an advance averaging about \$2 a ton. The alloy steel bar business has probably felt the declining automobile production schedules more

THE IRON AGE Composite Prices

Finished Steel

June 11, 1929, 2.412c. a Lb.

One week ago.....	2.412c.
One month ago.....	2.412c.
One year ago.....	2.341c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1929	2.412c., April 2:	2.391c., Jan. 8	
1928	2.391c., Dec. 11:	2.314c., Jan. 3	
1927	2.453c., Jan. 4:	2.293c., Oct. 25	
1926	2.453c., Jan. 5:	2.403c., May 18	
1925	2.560c., Jan. 6:	2.396c., Aug. 18	

Pig Iron

June 11, 1929, \$18.63 a Gross Ton

One week ago.....	\$18.71
One month ago.....	18.71
One year ago.....	17.23
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1929	\$18.71, May 14:	\$18.29, March 19	
1928	18.59, Nov. 27:	17.04, July 24	
1927	19.71, Jan. 4:	17.54, Nov. 1	
1926	21.54, Jan. 5:	19.46, July 13	
1925	22.50, Jan. 13:	18.96, July 7	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c. to 2.15c.
Del'd Philadelphia.....	2.27c.
Del'd New York.....	2.29c.
Del'd Cleveland.....	1.95c. to 2.00c.
F.o.b. Cleveland.....	2.00c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.05c.
F.o.b. Pittsburgh mills, cut lengths.....	2.30c.
F.o.b. Birmingham, mill lengths.....	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.....	1.85c. to 1.90c.
F.o.b. Chicago Heights mill.....	1.95c.
Del'd Philadelphia.....	2.27c.

Iron

Common iron, f.o.b. Chicago.....	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.15c.
F.o.b. Cosartville.....	2.05c.
F.o.b. Sparrow Point.....	2.05c.
F.o.b. Lackawanna.....	2.05c.
Del'd New York.....	2.22½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c. to 2.15c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Bethlehem.....	2.05c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.01c. to 2.06c.
Del'd New York.....	2.14½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.20c.
Wider than 6 in., Chicago.....	2.10c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.30c.
Bars, f.o.b. Chicago.....	2.30c.
Bars, Cleveland.....	2.35c.
Shafting, ground, f.o.b. mill.....	*2.65c. to 3.60c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pitts- burgh or Cleveland.....	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails.....	\$2.65 to \$2.75
Galvanized nails.....	4.65 to 4.75
Galvanized staples.....	3.35 to 3.45
Polished staples.....	3.10 to 3.20
Cement coated nails.....	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage.....	\$2.50 to \$2.60
Annealed fence wire.....	2.65 to 2.75
Spring wire.....	3.50 to 3.60
Galv'd wire, No. 9.....	3.10 to 3.20
Barbed wire, galv'd.....	3.30 to 3.40
Barbed wire, painted.....	3.05 to 3.15
Woven wire fence (per net ton to retailers).....	65.00
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Bir- mingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on produc- tion of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or North- umberland, Pa.	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.30c.
No. 10, blue annealed, del'd Phila.....	2.42c. to 2.52c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh.....	2.35c.
No. 13, f.o.b. Chicago dist.....	2.45c.
No. 13, del'd Philadelphia.....	2.67c.
Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh.....	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill.....	3.05c.
No. 24, del'd Philadelphia.....	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh.....	4.10c. to 4.20c.
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Galvanized

No. 24, f.o.b. Pittsburgh.....	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill.....	3.80c.
No. 24, del'd Cleveland.....	3.79c. to 3.89c.
No. 24, del'd Philadelphia.....	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham.....	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh.....	4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.00c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

	Alloy
Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb. S.A.E. Series	Differential
Numbers	

2000 (½% Nickel).....	0.25
2100 (1½% Nickel).....	0.55
2300 (3¼% Nickel).....	1.50
2500 (5% Nickel).....	2.25
3100 Nickel Chromium.....	0.55
3200 Nickel Chromium.....	1.85
3300 Nickel Chromium.....	3.80
3400 Nickel Chromium.....	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45
5100 Chromium Spring Steel.....	0.20
6100 Chromium Vanadium Bars.....	1.20
6100 Chromium Vanadium Spring Steel.....	0.95
9250 Silicon Manganese Spring Steel (flat).....	0.25
Rounds and squares.....	0.50
Chromium Nickel Vanadium.....	1.50
Carbon Vanadium.....	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. carry the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Chgo mill.....	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ½ in. and larger.....	\$2.80
Spikes, ¼ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel		Iron	
Inches	Black	Inches	Black
1½ to 2.....	45	1½ and 2.....	+11 +36
2½ to 3.....	51	2½ to 3.....	23 5
3½ to 4.....	56	3½ to 4.....	28 11
4½ to 5.....	60	4½ to 5.....	31 15
5½ to 6.....	62	5½ to 6.....	35 18

Lap Weld

2.....	55	43½.....	23 9
2½ to 3.....	59	47½.....	28 13
3½ to 4.....	56	43½.....	30 17
4½ to 5.....	54	42½.....	29 16
5½ to 6.....	53	40½.....	26 11

Butt Weld, extra strong, plain ends

1½ to 2.....	41	24½.....	¼ and ¾ +13 +45
2½ to 3.....	47	30½.....	¼..... 23 7
3½ to 4.....	53	42½.....	¾..... 28 12
4½ to 5.....	58	47½.....	1 to 2..... 34 18
5½ to 6.....	60	49½.....	
6½ to 7.....	61	50½.....	

Lap Weld, extra strong, plain ends

2.....	53	42½.....	¼..... 29 13
2½ to 3.....	57	46½.....	2½ to 4..... 34 20
3½ to 4.....	56	45½.....	4½ to 6..... 33 19
4½ to 5.....	52	39½.....	7 and 8..... 31 17
5½ to 6.....	45	32½.....	9 to 12..... 21 8
6½ to 7.....	44	31½.....	

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2½ in. 40	1½ in. 1
2½ in.—2½ in. 48	1½ in. 8
3 in. 54	2 in.—2½ in. 13
3½ in.—3½ in. 56	2½ in.—2½ in. 16
4 in. 58	3 in. 17
4½ in. to 6 in. 48	3½ in. to 3½ in. 18
	4 in. 20
	4½ in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts: Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in. 63	8 in. 48
1½ to 1½ in. 55	3½ to 3½ in. 50
1½ in. 39	4 in. 52
2 to 2½ in. 34	4½, 5 and 6 in. 42
2½ to 2½ in. 42	

Hot Rolled

2 and 2½ in. 40	3½ to 3½ in. 56
2½ and 2½ in. 48	4 in. 59
3 in. 54	4½, 5 and 6 in. 48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Iron and Steel Markets

Ingot Output Still at High Rate

June Production Likely to Rank With That of Three Preceding Months—Record Structural Awards—Pig Iron Weakens on Aggressive Selling

STEEL production shows little reduction from the record-breaking rate of May. Having become accustomed to performances in excess of expectations, the trade will not be surprised if the total output for June, allowing for the shorter working period, closely approaches the high average for the three preceding months.

Specifications from the automobile industry continue to show a decline, but the extent of the reduction has been less than had been looked for. Rail orders are approaching completion, although because of the pressure for the other materials they will occupy the mills longer than usual—in the case of one Chicago producer until early August. Tin plate is also feeling the effects of seasonal influences and standard pipe reflects the recession in general building activity, particularly residential construction.

Mill backlogs, however, are unusually large and little decline in production can be expected until deliveries improve materially. Unfilled orders showed only a small reduction in May, that of the Steel Corporation, 123,600 tons, comparing with over 455,000 tons one year previous.

Lest too much emphasis be given to evidences of reduced pressure on the mills, it should be noted that demand from many consuming groups is still buoyant. Construction work taking structural steel continues in large volume. Fabricated steel lettings, at 88,000 tons, have established a new weekly record. Included in the total were 34,000 tons for New York subways and 8000 tons for a Russian tractor plant.

Railroad equipment buying is featured by the largest locomotive order in years—150 engines for the New York Central—calling for fully 7500 tons of plates alone. While the week was a small one in car orders, freight equipment builders are well booked. Freight cars placed by domestic railroads in the first five months of this year numbered 55,500, compared with a total of 49,950 for all of 1928.

Pittsburgh district builders of river barges are heavily engaged, and agricultural implement makers are taking steel at an unchanged rate, notwithstanding that their inventory period is well advanced. However, seasonal changes in the type of farm equipment to be manufactured may result in a short interruption in specifications for material.

Large commitments in line pipe may be augmented by the placing of 200 miles of pipe by the Anaconda Copper Mining Co. for a line from a Wyoming gas field to its Montana works.

The excellent situation among machine tool manufacturers is significant not merely in terms of materials required, but also as an index of the high rate of industrial activity in general. Unfilled orders of

members of the National Machine Tool Builders' Association reached a new monthly record in May.

Chicago mills have not yet been able to improve their deliveries, which for plates and bars range from 12 to 14 weeks. Overflow tonnage from that district continues to reach mills farther East. At Pittsburgh, specifications in the heavier rolled products are virtually as large as in the closing week of May.

A surprising number of buyers are taking in full the remaining tonnage on their second quarter contracts, although the sole inducement is to get satisfactory shipments. Since existing prices have been reaffirmed for third quarter, reasons for specifying in excess of known requirements are lacking. Such contracts as have been placed for the coming three-month period have frequently called for as much steel as was used in the expiring quarter.

Contracts for black sheets have been closed by large buyers in the automotive field at 2.85c., Pittsburgh, which is the same price at which considerable large-lot business was taken for the second quarter, although \$2 a ton below the quotation now adhered to by some mills.

The inability of finishing mills to pass on increased costs to consumers makes it doubtful whether present prices on semi-finished material will be insisted on in third quarter contracts with non-integrated producers.

The pig iron requirements of steel makers are unabated. A Pittsburgh district company has closed for a large tonnage of basic to supplement its own production, and the Carnegie Steel Co. has lighted another blast furnace in its Duquesne group. Blast furnace operations in the Pittsburgh area are at the highest point since the war.

Foundries, however, are slow in covering for their third quarter needs. Melt, although still high in the North and East, shows a downward trend, and some second quarter tonnage will be carried over into the next period. Aggressive selling on the part of Alabama producers has resulted in the placing of trial orders for about 3500 tons of basic by Atlantic seaboard steel works and the naming of a delivered price figuring back to \$14, Birmingham, or \$1 a ton below the recent minimum. Buffalo foundry iron for delivery in the East has broken 50c. a ton to \$17.50, furnace.

Heavy melting scrap at Pittsburgh is unchanged, but a stronger market is reflected in advances in other grades of old material. Heavy melting steel has declined 25c. a ton at Chicago and Cleveland.

THE IRON AGE composite price for pig iron has declined to \$18.63 a ton from \$18.71, the peak thus far this year. Finished steel is unchanged at 2.412c. a lb. for the eleventh week.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
No. 2 foundry, Philadelphia...	\$21.76	\$21.76	\$21.76	\$20.76
No. 2, Valley furnace.....	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'tl.....	18.69	18.69	18.69	19.69
No. 2, Birmingham.....	15.00	15.00	15.00	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa.....	20.25	20.25	20.25	19.00
Basic, Valley furnace.....	18.50	18.50	18.50	15.35
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	18.76
Malleable, Chicago*.....	20.00	20.00	20.00	18.00
Malleable, Valley.....	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh.....	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	105.00	105.00	105.00	105.00

Rails, Billets, Etc., Per Gross Ton:	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	36.00	36.00	36.00	32.00
Sheet bars, Pittsburgh.....	36.00	36.00	36.00	33.00
Slabs, Pittsburgh.....	36.00	36.00	36.00	32.00
Forging billets, Pittsburgh...	41.00	41.00	41.00	38.00
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.85	1.85	1.85	1.85

Finished Steel,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.95	1.95	1.95	1.85
Bars, Chicago.....	2.05	2.05	2.05	2.00
Bars, Cleveland.....	1.95	1.95	1.95	1.85
Bars, New York.....	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh.....	1.95	1.95	1.95	1.85
Tank plates, Chicago.....	2.05	2.05	2.05	2.00
Tank plates, New York.....	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago...	2.05	2.05	2.05	2.00
Structural shapes, New York...	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh..	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh.	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago	3.05	3.05	3.05	2.80
dist. mill.....	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, P'gh...	3.80	3.80	3.80	3.70
dist. mill.....	2.35	2.35	2.20	2.10
Sheets, blue, No. 13, P'gh...	2.45	2.45	2.40	2.20
dist. mill.....	2.65	2.65	2.65	2.55
Wire nails, Pittsburgh.....	2.70	2.70	2.70	2.60
Wire nails, Chicago dist. mill.	2.50	2.50	2.50	2.50
Plain wire, Pittsburgh.....	2.55	2.55	2.55	2.55
Plain wire, Chicago dist. mill.	3.30	3.30	3.30	3.35
Barbed wire, galv., Pittsburgh	3.35	3.35	3.35	3.40
dist. mill.....	\$5.35	\$5.35	\$5.35	\$5.25
Tin plate, 100 lb. box, P'gh...				

Old Material, Per Gross Ton:	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Heavy melting steel, P'gh....	\$18.25	\$18.25	\$17.75	\$14.75
Heavy melting steel, Phila...	16.00	16.00	16.50	13.50
Heavy melting steel, Ch'go...	15.00	15.00	15.50	12.75
Carwheels, Chicago.....	14.25	14.50	14.50	13.00
Carwheels, Philadelphia.....	16.00	16.00	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.00	15.00	14.25
No. 1 cast, Philadelphia.....	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)...	15.00	15.00	15.50	14.00
No. 1 RR. wrot., Phila.....	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)...	13.50	14.00	14.00	11.50

Coke, Connellsville,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.60
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,	June 11, 1929	June 4, 1929	May 14, 1929	June 12, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	18.12½	18.12½	18.12½	14.87½
Electrolytic copper, refinery..	17.75	17.75	17.75	14.50
Tin (Straits), New York.....	44.50	43.62½	44.25	48.62½
Zinc, East St. Louis.....	6.65	6.55	6.67½	6.15
Zinc, New York.....	7.00	6.90	7.02½	6.50
Lead, St. Louis.....	6.80	6.80	6.75	6.15
Lead, New York.....	7.00	7.00	7.00	6.30
Antimony (Asiatic), N. Y. ..	9.00	8.87½	9.00	9.75

Pittsburgh

Slackening in Specifications Fails to Affect Steel Plant Operations—Large June Output Assured

PITTSBURGH, June 11.—Steel production in this and nearby districts is not yet showing the effects of the gradual tapering off in specifications. However, it is now generally admitted that the high rate of finishing mill operations in some departments is being maintained at the expense of backlogs. Reports of falling off in automobile requirements have been overemphasized in view of the fact that the two leading makers of cars in the low-priced field have not reduced their production schedules, but makers of alloy steel bars, strip steel and sheets have experienced a slight decline in the volume of their tonnage releases. Other large consuming lines are holding up well.

Pittsburgh district mills report no curtailment in the demands of agricultural implement makers, and movement of steel to manufacturers of automobile parts and accessories seems to be undiminished in spite of declining automobile production. Barge builders in the district have enough business to keep them running at capacity for two or three months and railroad car shops are equally well occupied. Makers of railroad equipment other than cars are also very busy, although the peak of activity in rails and track accessories has now passed.

Among the products which are dragging are tin plate and standard pipe, the former because of uncertainty in crop conditions, and the latter on account of reduced building activity and the failure of construction to get under way in the face of unfavorable weather conditions.

Makers of the heavy hot-rolled products have now opened their books for third quarter at 1.95c., Pittsburgh, for bars, shapes and plates. This leaves prices unchanged on all the ordinary finished steel products except blue-annealed sheets. If present quotations are adhered to, some custom-

ers, who were able to cover their second quarter requirements before present prices were made effective, will have to pay more for their steel in the third quarter than they are now paying.

Semi-finished steel prices have not yet been named by leading producers in this district, although non-integrated makers are anxious to cover their requirements. Steel companies are not yet actively seeking third quarter business, but on some products, notably plates and sheets, consumers are anxious to place future orders. In most cases there is little reduction in the total tonnage anticipated, and this tendency is considered a favorable augury of late summer and fall activity.

Open-hearth operations are keeping up well, and June is expected to be another very large month in this district. Pig iron production is also unchecked. The Carnegie Steel Co. has added another stack in the Duquesne group and now has all six in operation at that point. Furnace operations in the district as a whole are at the highest point since the war period. Merchant iron output is also high, but iron is moving rapidly into consumption and yard accumulations are small.

New buying, however, is light and pig iron consumers are not yet showing any particular interest in third quarter requirements.

The scrap market has a stronger undertone. Heavy melting steel is still quotable at \$18 to \$18.50, but several other grades have advanced.

Semi-Finished Steel.—Unfinished steel is still far from plentiful in the Pittsburgh and nearby districts, but slight curtailment of rolling mill operations in some departments has released tonnage for other products where the pressure for deliveries is unabated. As a result, the supply of crude steel is now much better adapted to demand than it was a month or six weeks ago, though the total output is practically unchanged. The present operating rate of open-hearth furnaces will certainly continue throughout June and the early part of July, and until that time the present close margin between supply and demand will likely show little change. Reserve supplies of billets and slabs, ordinarily sufficient for three or four weeks' operations, have now been reduced to a low point, and while it is unlikely that reserves of the former size will again be accumulated quickly, they will gradually be built up in periods of light activity. Non-integrated mills have not yet contracted for their third quarter requirements, and makers of semi-finished steel who sell a large part of their output seem reluctant to name prices for that period. Companies which sell only a small part of their crude steel are generally in favor of maintaining as high a price as possible on billets, slabs and sheet bars to give strength to the market on finished products. On the other hand, mills selling a good part of their tonnage to outside companies are reluctant to name higher prices to customers who cannot now pass on the advance to the consumers of their finished products. In view of this situation, it is possible that third quarter contracts may be placed at the second quarter quotations of \$34 a ton, Pittsburgh or Youngstown, for billets and slabs and \$35 for sheet bars, while the present price of \$36 will be named again for spot tonnages.

Pig Iron.—Evidences of a third-quarter buying movement are not yet marked in this district. Shipments of iron on old contracts are holding up well, but in new business the market is rather quiet. The Westinghouse Electric & Mfg. Co. is inquiring for a round tonnage of foundry iron for its Cleveland plant, and an unnamed consumer is asking for prices on 3000 tons for third quarter delivery. Nevertheless, definite inquiry is scarce, and there seems to be a growing tendency on the part of large buyers to cover their needs quietly without issuing a general inquiry. During the last week a steel company in the greater Pittsburgh district, not ordinarily a buyer of iron, is said to have closed on a large tonnage of basic to supplement its own production, and another steel company in the immediate Pittsburgh area is also said to be about to close for third quarter. Merchant stocks in the Valley district are unusually low, and, with the exception of radiator and sanitary ware makers, foundries will not carry much of their contract tonnage for this period into the third quarter. Considerable iron is expected to be bought in the next two weeks, as steel foundries and other consumers will be very active during the summer months. The price structure is unchanged. Small tonnages are regularly commanding \$18.50, Valley, for basic and foundry iron, and \$19 for malleable and Bessemer. The Pittsburgh district furnace is quoting f.o.b. prices 50c. a ton over this figure for delivery to Allegheny County points.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	\$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Bars, Shapes and Plates.—Leading makers have opened their books for third quarter at unchanged prices, or

1.95c., Pittsburgh, for bars, shapes and plates. This represents an advance of \$1 a ton over the second quarter price to some buyers, and as usual at the beginning of a quarter there is considerable talk in favor of forcing small users who do not cover their requirements by contracts to pay a \$2 premium. This price is obtained at present only in isolated cases where the tonnage is small and the specifications difficult. With unchanged prices, the end of the quarter is not expected to develop any particular rush of specifications, and the well-filled condition of mill order books has made producers indifferent in the matter of inducing customers to hasten their third quarter contracts. Shipments are being maintained at recent levels and the first two weeks of June have brought little, if any, falling off in tonnage releases against contracts. Delivery promises on bars and shapes average about four weeks and twice that time is required for plate shipments. Sizable structural tonnages placed in the last week include 1900 tons for a Pennsylvania Railroad freight shed in Pittsburgh and 550 tons for a factory building for the Standard Steel Propeller Co. at West Homestead, Pa. The Midland Barge Co. has taken five scows for New York State canal service, which will call for 400 tons of plates, and bids will be opened on June 17 at Cincinnati for several Ohio River barges. Barge builders in the Pittsburgh district are so well supplied with orders that they are not competing actively for miscellaneous business coming out at this time. Railroad car shops are taking steel at an undiminished rate and are now operating at practical capacity for the first time in two or three years.

Alloy Steel Bars.—Leading makers of round cornered square alloy steel bars have announced that after July 1 bars of this type under 4 in. in diameter will be sold on the same basis as carbon steel bars, with full extras applying, instead of on the billet basis, as in the past. This will represent an advance averaging about \$2 a ton. The alloy steel bar business has probably felt the declining automobile production schedules more

THE IRON AGE Composite Prices

Finished Steel

June 11, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.341c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.391c., Jan. 8
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

June 11, 1929, \$18.63 a Gross Ton

One week ago	\$18.71
One month ago	18.71
One year ago	17.23
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	\$18.71, May 14;	\$18.29, March 19
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel	
	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c. to 2.15c.
Del'd Philadelphia.....	2.27c.
Del'd New York.....	2.29c.
Del'd Cleveland.....	1.95c. to 2.00c.
F.o.b. Cleveland.....	1.95c. to 2.00c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Birmingham.....	2.15c.
C.I.F. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing	
F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.05c.
F.o.b. Pittsburgh mills, cut lengths.....	2.30c.
F.o.b. Birmingham, mill lengths.....	2.15c.

Rail Steel	
F.o.b. mills, east of Chicago dist.....	1.85c. to 1.90c.
F.o.b. Chicago Heights mill.....	1.95c.
Del'd Philadelphia.....	2.27c.

Iron	
Common iron, f.o.b. Chicago.....	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.15c.
F.o.b. Coatesville.....	2.05c.
F.o.b. Sparrow Point.....	2.05c.
F.o.b. Lackawanna.....	2.05c.
Del'd New York.....	2.22 1/2 c.
C.I.F. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c. to 2.15c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Bethlehem.....	2.05c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.01c. to 2.06c.
Del'd New York.....	2.14 1/2 c.
C.I.F. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.20c.
Wider than 6 in., Chicago.....	2.10c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.30c.
Bars, f.o.b. Chicago.....	2.30c.
Bars, Cleveland.....	2.35c.
Shafting, ground, f.o.b. mill.....	2.65c. to 3.60c.
Strip, P'gh.....	2.75c. to 2.85c.
Strip, Cleveland.....	2.75c. to 2.85c.
Strip, del'd Chicago.....	3.05c. to 3.15c.
Strip, Worcester.....	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pitts- burgh or Cleveland.....	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails.....	\$2.65 to \$2.75
Galvanized nails.....	4.65 to 4.75
Galvanized staples.....	3.35 to 3.45
Polished staples.....	3.10 to 3.20
Cement coated nails.....	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage.....	\$2.50 to \$2.60
Annealed fence wire.....	2.65 to 2.75
Spring wire.....	3.50 to 3.60
Galv'd wire, No. 9.....	3.10 to 3.20
Barbed wire, galv'd.....	3.30 to 3.40
Barbed wire, painted.....	3.05 to 3.15

Woven wire fence (per net ton to
retailers)..... 65.00
Chicago district mill and delivered Chicago
prices are \$1 per ton above the foregoing. Bir-
mingham mill prices \$3 a ton higher; Worcester,
Mass., (wire) mill \$3 a ton higher on pro-
duction of that plant; Duluth, Minn., mill \$2 a ton
higher; Anderson, Ind., \$1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or North- umberland, Pa.....	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.30c.
No. 10, blue annealed, del'd Phila.....	2.42c. to 2.52c.

Sheets

	Base per Lb.
No. 13, f.o.b. P'gh.....	2.35c.
No. 13, f.o.b. Chicago dist.....	2.45c.
No. 13, del'd Philadelphia.....	2.67c.

Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh.....	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill.....	3.05c.
No. 24, del'd Philadelphia.....	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh.....	4.10c. to 4.20c.
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Galvanized

No. 24, f.o.b. Pittsburgh.....	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill.....	3.80c.
No. 24, del'd Cleveland.....	3.79c. to 3.89c.
No. 24, del'd Philadelphia.....	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham.....	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh.....	4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.00c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Standard cokes, f.o.b. P'gh district mills..... \$5.35

Standard cokes, f.o.b. Gary..... 5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20 25-lb. coating I.C. \$16.70

15-lb. coating I.C. 14.00 30-lb. coating I.C. 17.75

20-lb. coating I.C. 15.30 40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers

2000 (1 1/2% Nickel)..... 0.25

2100 (1 1/2% Nickel)..... 0.55

2300 (3 1/2% Nickel)..... 1.50

2500 (5% Nickel)..... 2.25

3100 Nickel Chromium..... 0.55

3200 Nickel Chromium..... 1.35

3300 Nickel Chromium..... 3.80

3400 Nickel Chromium..... 3.20

4100 Chromium Molybdenum (0.15 to

0.25 Molybdenum)..... 0.50

4100 Chromium Molybdenum (0.25 to

0.40 Molybdenum)..... 0.70

4600 Nickel Molybdenum (0.20 to 0.30

Molybdenum, 1.25 to 1.75 Nickel)..... 1.05

5100 Chromium Steel (0.60 to 0.90

Chromium)..... 0.35

5100 Chromium Steel (0.80 to 1.10

Chromium)..... 0.45

5100 Chromium Spring Steel..... 0.20

6100 Chromium Vanadium Bars..... 1.20

6100 Chromium Vanadium Spring Steel..... 0.95

9250 Silicon Manganese Spring Steel

(flat)..... 0.25

Rounds and squares..... 0.50

Chromium Nickel Vanadium..... 1.50

Carbon Vanadium..... 0.95

Above prices are for hot rolled steel bars,

forging quality. The ordinary differential for

cold-drawn bars is 1/2 c. per lb. higher. For bil-

lets 4 x 4 to 10 x 10 in., the price for a gross

ton is the net price for bars of the same anal-

ysis.

Billets under 4 x 4 in. carry the steel bar

base. Slabs with a sectional area of 16 in. or

over carry the billet price. Slabs with sectional

area of less than 16 in. carry the bar price.

Rails

Standard, f.o.b. mill..... \$43.00

Light (from billets), f.o.b. mill..... 36.00

Light (from rail steel), f.o.b. mill..... 34.00

Light (from billets), f.o.b. Ch'go mill..... 36.00

Track Equipment

Base per 100 Lb.

Spikes, 1/2 in. and larger..... \$2.80

Spikes, 3/4 in. and smaller..... 2.80

Spikes, boat and barge..... 3.00

Tie plates, steel..... 2.15

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District
and Lorain, Ohio, Mills

Butt Weld

Steel

Inches Black Galv. Inches Black Galv.

1/2..... 45 19 1/2 and 3/4..... 11 +36

3/4..... 51 25 1/2..... 23 5

1..... 56 31 1/2..... 28 11

1 1/2..... 60 37 1/2..... 31 15

1 to 3..... 62 50 1 1/2 and 2..... 35 18

Lap Weld

2..... 55 43 1/2..... 23 9

2 1/2 to 6..... 59 47 1/2..... 28 13

7 and 8..... 56 43 1/2..... 30 17

9 and 10..... 54 42 1/2..... 29 16

11 and 12..... 53 40 1/2..... 26 11

Butt Weld, extra strong, plain ends

1/2..... 41 24 1/2..... 1 1/2 and 3/4..... 13 +48

3/4..... 47 30 1/2..... 23 7

1..... 53 36 1/2..... 28 12

1 1/2..... 58 41 1/2..... 34 18

1 to 1 1/2..... 60 49 1/2..... 34 18

2 to 3..... 61 50 1/2..... 34 18

Lap Weld, extra strong, plain ends

2..... 53 42 1/2..... 1 1/2..... 29 13

2 1/2 to 4..... 57 46 1/2..... 2 1/2 to 4..... 34 20

4 1/2 to 6..... 56 45 1/2..... 4 1/2 to 6..... 33 19

7 to 8..... 52 39 1/2..... 7 and 8..... 31 17

9 and 10..... 45 32 1/2..... 9 to 12..... 21 8

11 and 12..... 44 31 1/2..... 9 to 12..... 21 8

On carloads the above discounts on steel pipe

are increased on block by one point, with sup-

plementary discount of 5%, and on galvanized

by 1 1/2 points, with supplementary discount of

5%. On iron pipe, both black and galvanized

the above discounts are increased to jobbers by

one point with supplementary discounts of 5

and 2 1/2%.

Note.—Chicago district mills have a base two

points less than the above discounts. Chicago

delivered base is 2 1/2 points less. Freight is

figured from Pittsburgh, Lorain, Ohio, and Chi-

cago district mills, the billing being from the

point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel

2 in. and 2 1/2 in..... 40

2 1/2 in.—2 3/4 in..... 48

3 in..... 54

3 1/2 in.—3 3/4 in..... 56

4 in..... 59

4 1/2 in. to 6 in..... 48

Charcoal Iron

1 1/2 in..... 1

1 3/4 in..... 8

2 in.—2 1/4 in..... 13

2 1/4 in.—2 3/4 in..... 16

3 in..... 17

3 1/2 in. to 3 3/4 in..... 18

4 in..... 20

4 1/2 in..... 21

On lots of a carload or more, the above base

discounts are subject to a preferential of two

fives on steel and of 10 per cent on charcoal

iron tubes. Smaller quantities are subject to the

following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points

under base and one five; 10,000 lb. to carload,

4 points under base and two fives. Charcoal

Iron—Under 10,000 lb., 2 points under base;

10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler

Tubes

Cold Drawn

1 in..... 63

1 1/2 to 1 3/4 in..... 55

1 3/4 in..... 39

2 to 2 1/4 in..... 34

2 1/4 to 2 3/4 in..... 42

Hot Rolled

2 and 2 1/4 in..... 40

2 1/4 and 2 3/4 in..... 48

3 in..... 54

3 1

seriously than any other department of the steel industry, specifications having declined sharply in the last two weeks.

Rails and Track Supplies.—Demand has gradually tapered off, and pressure for deliveries of track equipment is no longer felt. Shipments have been heavier than usual this season, but activity in this department is ordinarily confined to about six months of the year, and the falling off at this time is to be expected. There is little demand for light rails on account of the depression of the coal industry. Price concessions are granted occasionally to meet the competition of the rerolled product.

Wire Products.—The wire market is holding up well and some improvement is reported in the demand for nails. Improved weather conditions have stimulated the demand for fencing and other wire products going to the agricultural industry, and heavier movement in that direction has largely offset slight declinings in specifications for manufacturers' wire. Prices are well sustained in this district.

Tubular Goods.—Following a temporary lull in line pipe activity, announcement has been made that the Anaconda Copper Mining Co. is again considering the purchase of 200 miles of pipe for a line from the Wyoming gas field to its Montana works. This project has been considered before, and, although the placing of the pipe is not imminent, recent reports indicate that the project will go forward. Demand from the oil country is more active than it was in the early spring and is showing a gradual improvement, particularly in the Oklahoma fields. Standard pipe for building purposes lacks momentum, but makers attribute this to the delay in building operations caused by the late spring as well as to declines in total residential building construction. Mechanical and boiler tubing are still active, showing little change from recent weeks.

Sheets.—Sheet mills in this and nearby district are still being operated at better than 95 per cent, and delivery promises show little improvement. Occasional large tonnages for immediate or early July delivery are placed with considerable difficulty and bring out the maximum quoted prices. The well sold-up condition of the market has stimulated many large consumers to place third quarter contracts earlier than usual, and a considerable tonnage for that period is already on the mill books. In view of higher contract prices in the second half of the year, users who were able to place second quarter business at prices prevalent early in the year are anxious to specify this tonnage, and releases in the last few days have been rather heavy. On third quarter business, mills are quoting 2.95c., Pittsburgh, on black sheets, 3.70c. on galvanized, 2.20c. on blue annealed light plates and 2.35c.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

on blue annealed sheets, No. 13 gage. On automobile body and metal furniture sheets, the quotations are 4.10c. and 4.20c. respectively.

Tin Plate.—Demand for tin plate is dragging, and although this tendency is seasonal, it has been more pronounced than usual in the last two or three weeks on account of the uncertainty of crop prospects. Operations continue to taper off, and mills which are maintaining the recent high rate are doing so entirely at the expense of backlogs. Container manufacturers are generally required to specify their August requirements before June 15 and this year are waiting until the last minute before making their commitments. Contracts for the second half have been closed by most of the large consumers.

Strip Steel.—Specifications for hot and cold-rolled strip are holding up fairly well, but the slowing down of several large automotive plants is being felt by many mills. Automotive parts makers are still requiring heavy tonnages in spite of the decreased production schedules at Detroit and a part of this demand is thought to be in anticipation of future business when new models are introduced. Large consumers of strip are showing interest in their third quarter requirements and early contracts indicate that the tonnage to be used during that period will not fall far short of second quarter business. A few users of cold-rolled strip are still objecting to the new extras introduced early in the quarter, but makers generally are adhering to this schedule, with prices ranging from 2.75c. to 2.85c., base Pittsburgh. On hot-rolled strip, prices are steady at 2c. for 6 in. and narrower, and 1.90c. for the wider sizes.

Coal and Coke.—The coke market

shows little change, with possibly a stronger undertone on the furnace grade. Production of furnace coke is considerably higher than usual at this time of the year, but blast furnace operations are at their peak for the year and the supply is well regulated to demand, with prices fairly well established at \$2.75 to \$2.85, Connellsville. Shipments of foundry coke are somewhat disappointing and prices are weak except on the premium brands, which are firm at \$4.85, ovens.

Old Material.—Heavy melting steel is still quotable at \$18 to \$18.50, although the Pennsylvania Railroad list brought about 25c. over this range for delivery to two points in the district. One or two small sales at higher than \$18.50 are reported, but with requirements which would ordinarily command a premium. In fact, outside of the transaction in railroad steel, sales have not bulked large in the last week. The market has gained a strong tone because of the scarcity of good steel and the expectation that the maintenance of high steel works operation for another month will bring several large buyers into the market. On compressed sheets \$18.50 is still the top. A sale of machine shop turnings at \$12 has boosted this grade 50c., while heavy breakable cast has declined on a sizable transaction at \$13. Specialties are stronger, with offerings scarce. More activity in the blast furnace grades is reported, but prices were unchanged in recent sales.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel.....	\$18.00 to	\$18.50
No. 2 heavy melting steel.....	15.50 to	16.00
Heavy melting car sides.....	17.00 to	17.50
Scrap rails	17.25 to	17.75
Compressed sheet steel.....	18.00 to	18.50
Bundled sheets, sides and ends	16.25 to	16.75
Cast iron carwheels	16.00 to	16.50
Sheet bar crops, ordinary.....	18.50 to	19.00
Heavy breakable cast.....	12.50 to	13.00
No. 2 railroad wrought.....	18.00 to	18.50
Hvy. steel axle turnings.....	16.00 to	16.50
Machine shop turnings.....	11.50 to	12.00
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	21.00 to	21.50
Railr. coil and leaf springs	21.00 to	21.50
Rollad steel wheels.....	21.00 to	21.50
Low phos. billet and bloom ends	22.00 to	22.50
Low phos., mill plates.....	22.00 to	22.50
Low phos., light grades.....	20.00 to	20.50
Low phos., sheet bar crops	20.00 to	21.00
Heavy steel axle turnings.....	16.00 to	16.50
Electric Furnace Grades:		
Low phos., punchings.....	19.50 to	20.50
Hvy. steel axle turnings.....	16.00 to	16.50
Blast Furnace Grades:		
Short shoveling steel turnings	12.00 to	12.50
Short mixed borings and turnings	12.00 to	12.50
Cast iron borings	12.00 to	12.50
Rolling Mill Grades:		
Steel car axles	21.50 to	22.00
Cupola Grades:		
No. 1 cast	15.00 to	16.00
Rails 3 ft. and under.....	20.00 to	21.00

The Canadian Furnace Co., Ltd., Port Colborne, Canada, has resumed operations after completing repairs and relining its blast furnace. Because of an increased demand for its brand of pig iron known as "Victoria," the company, while relining, increased the capacity to 500 tons per day.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$36.00
Rerolling, 4 in. and under 10 in., Youngstown	36.00
Rerolling, 4 in. and under 10 in., Cleveland	36.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	41.00

Sheet Bars

	Per Gross Ton
(Open Hearth or Bessemer)	
Pittsburgh	\$36.00
Youngstown	36.00
Cleveland	36.00

Slabs

	Per Gross Ton
(8 in. x 2 in. and under 10 in. x 10 in.)	
Pittsburgh	\$36.00
Youngstown	36.00
Cleveland	36.00

Skelp

	Per Lb.
(F.o.b. Pittsburgh or Youngstown)	
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
(Common soft, base)	
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

	Per Gross Ton
Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$16.25 to \$16.50
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75 to \$2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Chgo ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$31.00 to \$34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$31.00
11%	33.00
12%	\$35.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$24.00
7%	25.00
8%	26.00
9%	27.00
10%	\$29.00
11%	31.00
12%	33.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	\$1.40 to \$1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines ..	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to \$18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works
High-Heat Intermediate Heavy Duty Brick	
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Flow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons ..	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	70.00c. to 6.75c. per lb. off list

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E. 70	
Stove bolts in packages, Pittsburgh .80, 10 and 5	
Stove bolts in packages, Chicago .75, 20, 10 and 5	
Stove bolts in packages, Cleveland .75, 20, 10 and 5	
Stove bolts in bulk, Pittsburgh .80, 10, 5 and 2 1/2	
Stove bolts in bulk, Chicago .75, 20, 10, 5 and 2 1/2	
Stove bolts in bulk, Cleveland .75, 20, 10, 5 and 2 1/2	
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(1/2-In. and Larger)	
F.o.b. Pittsburgh or Cleveland	\$3.10
F.o.b. Chicago	3.20

Small Rivets

	Per Cent Off List
(1/4-In. and Smaller)	
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

	Per Cent Off List
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened ..	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread ..	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

No Decline in Steel Production in Sight Despite Reduced Demands from Automobile Industry

CHICAGO, June 11.—Indications of a decline in the current rate of steel production are not to be found here. While it is true that the automotive industry is producing on a lighter schedule, mills are finding a ready use for the semi-finished steel made available by the slackening demand from automobile companies. Farm implement manufacturers appear not to be adversely affected by the inventory period, prices for farm products or seasonal changes in types of equipment being manufactured. Specifications remain at the average of recent weeks and fully match current shipments.

Buyers, still having large tonnages due them on second quarter contracts, are taking a rather casual interest in new commitments. With respect to purchases, the market is neither dull nor active, new business being steady but relatively small in the aggregate. It cannot be said that a general buying movement is under way, though, as the third quarter draws nearer, consumers' interest shows some indications of broadening.

The scarcity of raw steel is no less acute so far as non-integrated mills are concerned. The next three weeks will bring a reduction in rail mill rolling schedules, though it is quite probable that the rolling period on present contracts will be prolonged somewhat beyond normal because of the necessity for allotment of raw steel in recent months.

Local steel mill books portray steady production for some time to come. Mills have had over four months of continuous operations at capacity, which is a record except for long-run periods during the war.

Pig Iron.—Contrary to expectations by the trade, shipments of Northern pig iron in the first week in June were in excess of those of the first week in May. Taken as a whole, this market is steady. Prices are firm. New buying is quiet after a buying movement which resulted in the coverage of about 75 per cent of third quarter needs. A few contracts for second half silvery are being closed. Reports of concessions in prices for charcoal iron have been run down to a resale lot of one car offered by a scrap dealer in western Michigan. Recent sales by brokers were at \$24 a ton, furnace. The Southern iron market is quiet, with only occasional small tonnage sales reported.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail). \$21.01 to	21.51
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 3 per cent.....	30.79
Bess. ferrosilicon, 14-15 per cent...	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Shipments of ferromanganese are steady and in large volume. The spiegeleisen market is quiet except for distribution of a tonnage received here several weeks ago by boat.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Reinforcing Bars.—Fresh inquiry for reinforcing bars is quite satisfactory for small lots, but large tonnages

are scarce. One inquiry is for 950 tons for an apartment building in Chicago. Shipments in the past week were light because many construction jobs were delayed during a structural steel erectors' strike. Differences between men and contractors have been settled and bar deliveries have been resumed. Cook County is undertaking a sizable bridge construction program. Included in the tonnage involved is the 1200 tons for the Burnham Avenue bridge. Prices for reinforcing bars out of Chicago warehouses lack stability.

Fluorspar.—One lot of 500 tons of this commodity has been taken by a consumer at \$18 a ton, f.o.b. Illinois mines. Small sales are more numerous and shipments are large.

Plates.—Consumption of plates in this district is unchecked, and some new business, where delivery is of primary importance, is still being diverted to other producing centers. This flow of orders out of the Chicago territory is tending to build up the backlogs of outside mills, and deliveries by them are now less satisfactory. A Southern oil refiner has ordered tanks that will require 2500 tons of steel, which will be fabricated in Chicago. The pending list for oil storage tanks is smaller, following the placing of several contracts with

shops that will draw on their steel needs from mills in districts east of Chicago. In the meantime, local shops and those in the Southwest are well supplied with work, and order books are of such size as to assure satisfactory operations through the summer months. The railroad car market is quiet except in the matter of steel needed for past contracts. Local mills, in estimating the steel required for car contracts already placed, find that about 55,500 cars were ordered in the first five months of the year for the country as a whole. In the same period of 1928, only 26,700 cars were ordered, whereas for all of last year the total is placed at about 49,950. Car builders, at first cautious in building organizations to hurry through contracts, are now more anxious to increase output and are doing so in proportion to their ability to get steel. Delivery to car shops is as heavy as mill allotment of steel will permit. Chicago mills are scheduled through the summer, and deliveries have not improved from 12 to 14 weeks. A substantial volume of business is emanating from boiler shops.

Structural Material.—Awards total about 3500 tons in one of the most active weeks in some time. This tonnage is made up of a number of moderate-sized orders from a wide territory and includes several small lots from railroads. Fresh inquiries total 3000 tons, including 1200 tons for a Kansas City, Mo., office building, plans for which have recently been revised. Among the more active jobs are 5000 tons for a power house at Michigan City, Ind., and 500 tons for a factory in the same city. New bids will soon be taken on the Fine Arts Building, Chicago. It is now proposed to purchase only the steel necessary to revamp the outside walls of the structure. According to estimates made to date, this will require about 2000 tons in place of the 5000 tons originally asked for. Local fabricators, though in possibly a little better position than at the turn of the month, are still operating on reduced schedules and with meager backlogs.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Cold-Finished Bars.—Third quarter books are open at 2.30c. a lb., Chicago, and forward buying is progressing at a moderate pace. Specifications have changed little in volume in recent weeks, and local producers are operating at capacity. Deliveries average three weeks.

Bars.—Chicago bar mills are fully engaged and specifications are equal to shipments. Promises of deliveries range from 12 to 14 weeks. Parts makers in this district are only slightly affected by the drop in automobile manufacture, which is estimated in some quarters as not over 10 per cent below the output at the end of last month. The use of bars for railroad car construction is large, and farm implement manufacturers give no indication of an immediate change in the rate of demand. The inventory period for the farm machinery industry is

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.40c.
Reinforc'g bars, rail steel.....	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (1/4 in. in Nos. 10 and 12 gages).....	3.20c.
Hoops (No. 14 gage and lighter)...	3.75c.
Black sheets (No. 24).....	4.05c.
Galv. sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, 1/4 in. and larger.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	4.00c.
Rivets, boiler.....	4.00c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank...	60
Hot-pressed nuts, hex., tap. or blank...	60
No. 8 black ann'd wire, per 100 lb. \$3.45	
Com. wire nails, base per keg.....	3.20
Cement c'd nails, base per keg.....	3.20

well advanced and so far has made no impression on steel shipments. There is, however, a possibility that seasonal changes in the type of equipment to be manufactured may affect adversely the use of steel by a short interruption in releases. Chicago alloy steel bar mills are operating at capacity, with backlogs that average six weeks. Forward contracting is proceeding at a moderate pace. Specifications for iron bars are steady and new buying is in good volume. Contracting in rail steel bars is gaining ground, but the total so far is comparatively small. Specifications are fully equal to shipments and mill backlogs are undiminished. Prices are firm at 1.95c. a lb., Chicago Heights. Although fence post business so far in June is in good volume, it is spotty in character.

Wire Products.—Shipments of wire and wire products are steady. Specifications so far in June are well sustained and in volume are well ahead of the corresponding period a year ago. New buying is moderately active. Prices are steady. Turnover by the jobbing trade is spotty, but as a whole it is quite satisfactory for this time of the year. Releases by the manufacturing trade are steady from most sources except the automobile trade, many units of which are expecting to show new models about Aug. 1.

Cold-Rolled Strips.—Manufacturers of light automobiles are pressing for fender stock. Mill backlogs range from seven to eight weeks and output is at rated capacity. New buying is moderately active. Prices are steady.

Rails and Track Supplies.—This market is quiet except in orders for track supplies. Output of standard-section rails is being held to 85 per cent of capacity, and this rate will be maintained to early July by one producer and to the early part of August by another. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—Sales late last week of 20,000 tons of heavy melting steel brought out new prices of \$15 to \$15.50 a gross ton, delivered. The reduction of 25c. a ton on this grade is reflected in lower prices for other grades. Dealers are now able to buy melting steel freely at \$15. Taken as a whole, this market is dull and prices have a decided tendency to seek lower levels. Shipments to consumers are large except in the case of gray iron foundries. Incoming supplies are ample to such an extent that few melters are giving thought to building stocks. In weeks past, when malleable grades were scarce, sellers went far in their search for supplies. Their success is indicated by heavier shipments, with resultant easing in prices. The supply of plate scrap is freer and carloads have moved this week to consumers at \$17 a gross ton, delivered. Brake shoes have sold off \$1 a ton. The St. Paul is offering 8000 tons, in-

cluding 5000 tons of short and long rails, and the Northern Pacific will sell 2000 tons.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$15.00 to \$15.50
Shoveling steel	15.00 to 15.50
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydraul. compressed sheets	13.25 to 13.75
Drop forge flashings	11.00 to 11.50
No. 1 busheling.....	13.25 to 13.75
Forg'd cast and r'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	15.00 to 15.50
Low phos. punchings.....	16.75 to 17.25
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Short shoveling turnings.....	10.00 to 10.50
Machine shop turnings.....	7.25 to 7.75
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft. ..	18.50 to 19.00
Steel rails less than 2 ft. ..	19.00 to 19.50
Angle bars, steel.....	17.00 to 17.50
Cast iron carwheels	14.50 to 15.00
Malleable Grades:	
Railroad	17.75 to 18.25
Agricultural	15.75 to 16.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb. ..	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles.....	26.00 to 26.50
Steel car axles.....	16.50 to 17.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	13.25 to 13.75
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast.....	15.00 to 15.50
No. 1 railroad cast.....	13.75 to 14.25
No. 1 agricultural cast.....	13.25 to 13.75
Stove plate	12.25 to 12.75
Grate bars	12.00 to 12.50
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bolts, Nuts and Rivets.—Demand is steady, including releases by the farm implement manufacturing trade. Contracting is gaining headway faster in outlying districts than it is nearer the large centers of production. This may be explained in part by the fact that some local sellers are tardy in submitting contracts for the coming quarter.

Cast Iron Pipe.—This market is quiet except in carload lots. Here and there, however, are indications that business will improve later in the month. This is especially true of Michigan, where there are signs that contractors soon will have tonnages to offer. The McWane Cast Iron Pipe Co. has taken a small tonnage for Granville, Ohio, and 30,000 ft. of 6-in. pipe for Woodville, Ohio. It is reported here that the American Cast Iron Pipe Co. has been awarded 28,000 ft. each of 6 and 8-in. pipe by Canton,

Ohio. Among fresh inquiries is one for 24,000 ft. of 6 and 8-in. pipe for Weston, Ohio. Prices are steady in the range of \$37 to \$38 a ton, Birmingham, for 6-in. and larger diameters.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$3 extra.

Sheets.—Specifications against second quarter contracts are numerous and the aggregate tonnage is large. Hot mills are producing at 85 per cent of capacity. However, it is probable that this rate cannot be maintained steadily during warm weather. Demand for sheets from manufacturers of farm machinery and from the jobbing trade is unchanged. Container manufacturers are operating at capacity, and specifications from the roofing trade are more liberal. Releases against contracts are a trifle heavier in the aggregate. Deliveries are less favorable. Blue annealed sheets may be had in eight weeks and the black and galvanized commodities in five to six weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Coke.—Shipments of by-product foundry coke are a shade lighter as the melt in gray iron foundries becomes spotty. Last-half buying is near the end. Prices are firm at \$8 a ton, f.o.b. local ovens. All Chicago ovens are lighted.

Chicago Building Projects Below May, 1928

The extent of the decline in building activity in Chicago is emphasized in a report of the building commissioner's office for May. The total cost of new projects for that month decreased about 15 per cent, compared with the total for May, 1928. The gross in the past month was enhanced to the extent of \$16,500,000 because of the issuance of a permit for the Mercantile Mart, on which work has been under way for some time.

Steel Corporation Names Boats for Officials

Three Lake boats, being built for the Pittsburgh Steamship Co., subsidiary of the United States Steel Corporation, have been named in honor of officials of parent company and other subsidiaries. A boat that is being constructed at the River Rouge yard of the Great Lakes Engineering Works has been named the Myron C. Taylor, in honor of the chairman of the finance committee of the Steel Corporation. Steamers being built at the Lorain yard of the American Shipbuilding Co. have been named for William G. Clyde, president, Carnegie Steel Co., and Horace Johnson, president, Duluth & Iron Range Railroad Co.

New York

Pig Iron Prices Weaken—Third Quarter Buying Slow— Steel Demands Show No Let-up

NEW YORK, June 11.—Pig iron prices have weakened, Buffalo foundry iron now being available at \$17.50, base furnace, or 50c. a ton below the recent minimum. Some sellers, however, continue to ask \$18. The dip in the market may have been induced by the threat of increased competition from Alabama furnaces or by anxiety for third quarter business, or by both factors. Melters have been unusually slow in taking action on their requirements for the next quarter. Although sales in this district for the week, totaling 11,000 tons, showed a good gain, the increase was the result of solicitation on the part of sellers rather than a rise in the volume of inquiries. There are some evidences, however, of growing consumer interest, as pending business that has recently appeared aggregates about 4500 tons. The Norfolk & Western railroad is in the market for 900 tons of miscellaneous grades. The Southern wants 100 tons of foundry iron. The American Locomotive Co. is expected to require considerable iron for the 150 locomotives that it will build for the New York Central. However, many locomotive parts formerly cast in gray or malleable iron by the locomotive company are now sublet to steel foundries. The extent that Alabama iron will be a factor along the North Atlantic seaboard will depend on whether the Interstate Commerce Commission suspends or sustains the proposed rate reductions from Birmingham. Under the new rail and water rates, Alabama iron would reach some points, such as Providence, R. I., at delivered prices equivalent to \$17, base Buffalo. Barge shipments from Buffalo to this district are by no means as large as at this time a year ago.

Prices per gross ton, delivered New York district:

Buffalo No. 2, fdy., sil. 1.75	
to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.	
N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Finished Steel.—The fact that consumers are in many instances specifying in full the remaining tonnage on their second quarter steel contracts shows that most of them expect to need the steel. The only inducement for such specifying now is to get satisfactory deliveries, as there is no advance in prices to stimulate specifications in excess of known requirements. Most of the mills making plates, shapes and bars have opened their books for the third quarter at unchanged prices and have covered a good portion of their contract customers for the three months beginning

July 1. In almost every instance consumers are contracting for as much steel for the third quarter as they have used in this quarter. In plates and shapes, Eastern mills are getting the benefit of overflow tonnage from the West, and deliveries on these products have not changed much. Bar deliveries are a little easier, ranging now from two to four weeks. The tin plate situation also is easier, and deliveries on new orders can be promised for late June or early July. Although shipments of sheets and strip steel can be made in less time than was possible a month ago, the mills are generally booked solid for three or four weeks, at least, and on some finishes the delivery time is longer. A few sheet mills which have been well sold-up through a greater part of the summer report no relief in their delivery situation. The New York Central order for 150 locomotives, placed with the American Locomotive Co., will take at least 7500 tons of plates in addition to a large tonnage of other steel and iron. Structural steel business is featured by the placing of 34,000 tons of fabricated material with the American Bridge Co. by the Corson Construction Co., which will build the subways under Houston and Essex Streets. Railroad work bulks large in new structural inquiry. The Delaware, Lackawanna & Western is in the market for 4000 tons for catenary bridges for electrification of lines in New Jersey and the New York Central is taking bids on 3000 tons for a car and locomotive repair shop at Harmon, N. Y.

The May total of fabricated steel work contracted for in the New York metropolitan district was 34,575 tons. This is exclusive of subways, bridges and similar engineering work. The April total was 37,543 tons and that of May, 1928, was 46,002 tons. These figures are compiled by the Structural Steel Board of Trade of New York, which also reports that the total for the first five months of 1929 was 196,386 tons, as compared with 161,569 tons in the corresponding period of 1928. Most of this gain, however, was in the first quarter. About 80 projects in the New York district, on which bids have gone in, are still pending. The tonnage in these jobs is about 50,000 tons.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Reinforcing Bars.—Lettings of more than 100 tons are few, but several attractive tonnages are in prospect. Several thousand tons will be required for new subway sections in the Bronx, on which general contract bids will soon be taken, and about 400 tons will be bought for the second section of the West Side elevated highway, New York. Prices on concrete bars have not been advanced,

but they are reported firmer at the figures given below.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Cold-roll. strip, soft and quarter	
hard.....	5.15c. to 5.40c.
Hoops.....	4.25c.
Bands.....	3.75c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terne sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger..	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	.60
1 x 30 in. and smaller..	.50 to .50 and 10

Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	.60
¾ x 20 in. and smaller..	.50 to .50 and 10

Coach screws:	
¾ x 6 in. and smaller.....	.60
1 x 6 in. and smaller..	.50 to .50 and 10

	Per 100 Ft.
Boller Tubes—	
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
¾-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—		
¾-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	3.80c.
No. 22.....	3.95c.
No. 24.....	4.00c.
No. 26.....	4.10c.
No. 28*	4.25c.
No. 30.....	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.40c.
No. 16.....	4.25c.
No. 18.....	4.40c.
No. 20.....	4.50c.
No. 22.....	4.60c.
No. 24.....	4.75c.
No. 26.....	5.00c.
No. 28*	5.25c.
No. 30.....	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—Jobbers are still receiving sizable orders as a result of the well-filled condition of mills, but June is not expected to be so good a month as May. Demand for structural material is still active, and prices are slightly firmer. Steel bar prices are steady, and orders are reported to be slightly larger in size and more numerous.

Cast Iron Pipe.—Prices quoted on recent inquiries for small lots of pressure pipe are rather irregular. Yonkers, N. Y., opened bids June 6 on about 75 tons of fittings and will take bids June 13 on 200 tons of 6-in. Class C water pipe. Inquiry for export is active, but tonnages are in most instances small. On about 10,000 tons of pipe for the Government of the Philippines, bids on which were opened June 3, the American Cast Iron Pipe Co., Birmingham, was low. Recent export inquiries for tonnages of pipe ranging from a carload to 200 tons or more have come from Russia, Mexico and Cuba.

Prices per net ton deliv'd New York:
Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$33.60 to \$39.60; 3-in., \$45.60 to \$46.60. Class A and gas pipe, \$3 extra.

Coke.—The market is quiet. Prices are unchanged at \$2.75 to \$2.85 per net ton, Connellsville, for standard furnace coke. Special brands of beehive coke remain at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn. By-product coke is quoted at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—All grades of scrap are unchanged in price. No. 1 heavy melting steel is being bought by brokers at \$15.50 and \$15.75 per ton, delivered Claymont, Del., and Coatesville, Pa., and at \$16 per ton, delivered Bethlehem, Pa. Some substantial tonnages of No. 1 and No. 2 heavy melting steel have recently been shipped for export, and an inquiry is in the market for about 30,000 tons of No. 1 heavy melting steel for Japan.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$12.00 to \$13.35
Heavy melting steel (yard)	8.25 to 9.25
No. 1 hvy. breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.25
Locomotive grate bars	8.25 to 8.75
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles	19.25 to 19.75
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	13.00 to 13.50
Cast iron carwheels	12.00 to 12.25
Stove plate (foundry)	8.25 to 9.00
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Cleveland

Volume of Steel Business Declines, But Backlogs Are Still Large—Some Third Quarter Contracting

CLEVELAND, June 11.—Present prices on steel bars, plates and shapes have been reaffirmed for the third quarter by most of the mills and some contracts have been closed for that delivery. With the naming of these prices, all second quarter prices on finished steel products have been reestablished for the coming quarter except on blue annealed sheets, which were advanced under the new classification. A change has been made on the quality card for steel bars by the adoption of a new extra for steel with a high sulphur content. This extra is 17½c. per 100 lb. for minimum sulphur content between 0.11 and 0.12 per cent.

The volume of business has declined considerably the past week in about all forms of finished steel, indicating that the expected summer lull is at hand. However, mills have good backlogs for nearly all products, so that not much decline in production is expected for some time, or until they catch up considerably on deliveries. Aside from a moderate seasonal slowing down in the automotive industry, most consuming industries are maintaining their recent rate of operations.

Deliveries so far have improved only on sheets, strip steel and alloy steel bars, and there is still considerable pressure for shipments. In spite of curtailment, the automotive industry is still going at a satisfactory pace and is expected to set a good record for June.

With no change in prices, no general attempt will be made to require consumers to send in specifications against expiring contracts by June 15.

While inquiry in the building field continues light, more work is in prospect than a few weeks ago. Low prices are reported on fabricated work.

Prices for current orders are 1.95c. to 2c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and structural material.

Iron Ore.—The heavy movement of ore down the Lakes during May is reflected in a large increase of shipments from the docks to interior furnaces. Shipments from Lake Erie docks last month were 5,053,838 tons, as compared with 2,407,602 tons during the corresponding period last year. Shipments for the season to June 1 were 6,730,494 tons, against 2,804,848 tons in the same period a year ago. Receipts at Lake Erie ports to June 1 were 7,944,349 tons, as compared with 2,848,088 tons up to June 1 last year. As most of the ore is going directly to the furnaces, dock stocks remain low. The dock balance at Lake Erie ports June 1 was 3,871,191 tons, against 4,934,564 tons on the same date a year ago. The high Lake levels this year enabled boats to carry larger cargoes than for a number of years. The steamer Harry Coulby brought 14,381 tons of ore to a Cleveland dock last week, the largest ore cargo ever brought to a Lake Erie port.

Pig Iron.—Activity increased slightly the last week, during which Cleveland interests sold 25,000 tons in foundry and malleable iron, a considerable portion for early shipment, the remainder for the third quarter. While a general buying movement for the third quarter has not yet developed, some of the furnaces have accumulated a fair backlog for that delivery as a result of the steady but moderate buying

that has been going on the past few weeks. Considerable iron bought by jobbing foundries for the second quarter will be carried over into the next quarter. The automotive industry has not yet bought much iron for the third quarter. Consequently the market in Michigan is rather dull. Prices are unchanged at \$18.50, Cleveland, for outside shipment and \$19 for local delivery. In Michigan, furnaces have been quoting \$20 to \$20.50 for both foundry and malleable iron, but effort to get the higher price seems to have disappeared outside of certain sections. Low phosphorus iron is quiet. An inquiry is pending from Buffalo for 500 tons. Shipping orders for pig iron from the automotive and other industries have declined somewhat this month. However, some of the furnaces are still shipping all the iron they are making.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., 1.75 to 2.25	\$21.00 to 21.50
Malleable	19.50
Ohio silvery, 8 per cent.	29.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Strip Steel.—Specifications for hot-rolled strip show a moderate decline and deliveries are gradually gaining. Some consumers in the automotive field have placed orders for their re-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	3.25c. to 3.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to 14 in. inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.95
No. 9 gal. wire, per 100 lb.	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

quirements for July and August, but for some reduction in quantities as compared with their recent requirements. The demand for cold-rolled strip has fallen off more than for hot-rolled material. Consumers of both hot and cold-rolled strip are showing less eagerness than earlier in the year to get orders on the mill books, as they feel that they will not have serious trouble in getting deliveries they desire and few as yet have placed third quarter contracts. The market is firm at the reestablished second quarter prices.

Warehouse Business.—Sales declined the first few days of the month, but business is now back at about the recent volume. Heavy plates are in very active demand. Sheets are moving well, particularly blue annealed, the demand for which has been stimulated by the slow mill deliveries.

Semi-Finished Steel.—While some of the mills are naming for the third quarter their present price of \$36, Cleveland and Youngstown, for sheet bars, billets and slabs, buyers are resisting the advance in view of the fact that prices on their own products have not been marked up. No business has as yet been taken for the coming quarter.

Sheets.—Specifications fell off considerably the past week, and some of the mills have made quite a reduction in their backlogs. The decline in orders is for the most part in the automotive industry, although business from some of the steel barrel manufacturers has fallen off sharply. Production so far has not been curtailed and shipments have not yet declined, although some decrease is expected shortly. The slowing down naturally has affected the delivery situation. Shipments of blue annealed sheets can now be secured in two weeks and on auto body sheets in five weeks. Some of the automobile builders have covered for their July requirements, but consumers generally are showing little interest in third quarter contracts. Large buyers in the automotive field will be able to make contracts for

black sheets at 2.85c., Pittsburgh, and it is understood that some round-lot business has been placed in Detroit at that price. Considerable of the large-lot business for the second quarter was taken at 2.85c., while 2.95c. is an open quotation, some current orders are still being taken at the lower price. Blue annealed sheets appear firm at the new base. Galvanized sheets are still available at 3.60c., Pittsburgh.

Wire Products.—While manufacturers' wire is moving in good volume, some consumers are falling behind with specifications against contracts and tonnage probably will be carried over to the next quarter. Nails are only moderately active. Prices are well maintained.

Coke.—While specifications against contracts for foundry coke are fair, the demand is not quite as heavy as last month. Consumers are not showing much interest in third quarter contracts. Ohio by-product coke is unchanged at \$8.25, Painesville.

Old Material.—The market is about 25c. a ton weaker on steel-making grades and 50c. on blast furnace grades. The weakness is apparently due to continued regulation of shipments of steel-making scrap by one local consumer and the heavy shipments of both grades by water from Detroit. Local prices of blast furnace scrap have been forced down by the

Detroit competition. A local mill has bought a moderate tonnage of selected heavy melting steel scrap, but others are purchasing only odd lots that are offered at attractive prices. Dealers are paying \$16 for selected heavy melting steel scrap for delivery to one local mill. Scrap is plentiful, but dealers are buying very little because of their inability to ship against outstanding orders.

Prices per gross ton delivered consumers yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$15.00 to \$15.50
No. 2 heavy melting steel.	14.50 to 15.00
Compressed sheet steel....	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings....	13.00 to 13.25
Machine shop turnings....	9.25 to 9.50
No. 1 railroad wrought....	13.50 to 14.00
No. 2 railroad wrought....	16.00 to 16.50
No. 1 busheling	13.00 to 13.50
Pipes and flues	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops..	17.75 to 18.00
Low phos., billet, bloom and slab crops.....	18.50 to 18.75
Low phos., sheet bar crops.	18.00 to 18.50
Low phos. plate scrap....	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings.....	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling.....	10.75 to 11.00
Cupola Grades	
No. 1 cast	17.25 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Furnace Repairs Curtail Ingot Output—Southern Basic Bought for Trial By Eastern Steel Makers

PHILADELPHIA, June 11.—The high rate of steel plant operations is beginning to affect open-hearth furnaces, so that some mills are finding it necessary to curtail ingot output to make repairs. One mill, which has been operating five of a total of six furnaces for some months, is temporarily running three and another has dropped from nine to eight furnaces for repairs.

Buyers are beginning to show interest in third quarter contracts for plates and bars and in certain instances have entered into commitments. Sheet consumption continues on a slightly reduced scale and delays in deliveries are shorter, varying from a fortnight with some mills to four weeks or more with others.

Birmingham basic pig iron has appeared as a competitor for eastern Pennsylvania business and a number of trial orders have been placed by eastern Pennsylvania steel mills.

Ferromanganese.—Most consumers are covered with contracts at \$105 per ton, seaboard or furnace, for the remainder of the year, but, with eastern Pennsylvania consumers of basic considering the purchase of Birmingham iron, there appears the possibility of increased demand for ferromanganese to offset the low manganese content of the Southern product. In May, about 90,000 tons of manganese ore arrived at Baltimore.

Pig Iron.—Although Birmingham foundry iron is being freely offered to consumers in this district, the tonnage sold has not as yet been large and furnaces have not offered to meet the delivered prices quoted by Southern sellers. One recent offer of Birmingham foundry iron to a consumer in

this district is understood to have figured back to \$14 a ton, furnace. Meanwhile, Southern basic iron is offering keen competition, and trial orders of 500 to 1000 tons each have been placed with Southern sellers by consumers at Trenton, N. J., Claymont, Del., Coatesville and Pottsville, Pa. One large consumer has closed on about 10,000 tons of basic iron, of which 5000 tons went to an eastern Pennsylvania furnace and the rest is reported to have been Birmingham iron. The all-rail freight rate from Birmingham to Philadelphia is \$6.02. Inquiry for small lots of foundry iron for third quarter delivery is active, especially from the railroads. The Southern Railway is inquiring for 100 tons of foundry iron for third quar-

Warehouse Prices, f.o.b. Philadelphia

Base per Lb.	
Plates, ¼-in. and heavier.....	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron.....	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex....	3.60c.
Cold-fin. steel, sq. and flats.....	4.10c.
Steel hoops	3.40c.
Steel bands, No. 12 to ⅜-in. inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24).....	4.10c.
†Galvanized sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.25c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

ter, the Norfolk & Western for 1000 tons for last half delivery, the Baltimore & Ohio for 200 tons of foundry and 50 to 75 tons of charcoal iron, the Delaware, Lackawanna & Western for about 200 tons, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for a carload of foundry and the York Ice Machinery Corporation, York, Pa., 150 tons of foundry. The Westinghouse Electric & Mfg. Co. has closed on 400 tons or more for its Essington, Pa., plant.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	21.76 to 22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X, 2.25 to 2.75 sil.	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Mills are still well engaged with tonnage and offering deliveries of three to four weeks. Consumers are beginning to show some interest in third quarter contracts. The price is firm at 1.95c., Pittsburgh, or 2.27c. per lb., delivered Philadelphia.

Reinforcing Bars.—Tonnages in the market at present are in most cases small. The Magee Carpet Co., Bloomsburg, Pa., has awarded 300 tons of rail steel bars for a new building to the Gilmour-Roslyn Steel Co. Billet steel bar prices range from 1.90c. to 1.95c. a lb., Pittsburgh, quoted by eastern Pennsylvania makers, to 2c. and 2.05c., Pittsburgh, quoted by Pittsburgh makers. Delivered Philadelphia, billet steel bars are 2.22c. to 2.37c. a lb., with \$5 extra for cutting to length. Rail steel bars are about 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Fabricated steel projects still reach a substantial tonnage, despite the advanced season, and most fabricating shops are well engaged. Shape prices are unchanged at 1.95c. to 2c. a lb., f.o.b. nearest mill to consumer, or 2.01c. to 2.06c. per lb., delivered Philadelphia, based on Pencoyd, Pa. On especially desirable business, 1.95c., f.o.b. mill, is occasionally shaded.

Plates.—Operations continue at a high rate and mills have some substantial business in prospect, which, it is believed, will serve to maintain good operations in the next quarter. Buyers are showing interest in third quarter contracts, and in some instances have covered their requirements for part of the next quarter at the current price of 2.05c. per lb., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Sheets.—Delivery terms are shorter than early in the quarter, ranging from two and three weeks with some mills to three and four by others. Au-

tomobile body builders are consuming less tonnage, particularly manufacturers of commercial bodies. Meanwhile, radio manufacturers are providing some good business. Prices are being maintained, with black sheets at 2.95c., Pittsburgh, or 3.27c., delivered Philadelphia; galvanized at 3.70c., Pittsburgh, or 4.02c., Philadelphia; No. 10 gage blue annealed light plates, 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, and No. 13 gage blue annealed sheets, 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia.

Warehouse Business.—Steel hoops and bands have been advanced \$3 a ton to 3.55c. a lb., base, for hoops and 3.30c., base, for bands. Blue annealed sheets are now quoted by jobbers on the new mill bases and extras for gage. Blue annealed light plates, No. 10 gage, are 3.25c. a lb. and blue annealed steel sheets, No. 13 gage, are 3.40c. a lb., base.

Imports.—In the week ended June 8, 1157 tons of pig iron arrived at this port, of which 1000 tons was from the United Kingdom and 157 tons from the Netherlands. Ore arrivals were 2261 tons of chrome ore from Portuguese Africa. Steel imports were 200 tons of structural shapes, 25 tons of steel plates, 98 tons of steel bars and 10 tons of steel bands from Belgium, 99 tons of iron bars and 49 tons of steel bars from Sweden, and 29 tons of steel bars from France.

Old Material.—Consumer buying is at a low ebb, but consumers' stocks of scrap, especially No. 1 heavy melting steel, are not excessive and further buying by mills is expected before long. Brokers are asking \$16.50 a ton for No. 1 heavy melting steel, and mills are unwilling to pay more than \$16, the latest purchase price. Stove plate is weak, with a Phoenixville, Pa., consumer buying at \$11.50 per ton, delivered, 50c. less than the price at which contracts were closed recently.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$16.00
Scrap T rails	15.50
No. 2 heavy melting steel.	\$12.50 to 13.50
No. 1 railroad wrought.	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.00 to 15.00
Hydraulic compressed, old.	11.50 to 12.00
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 blast f'nce scrap.	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50
Shafting	19.50 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.00 to 16.50
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Blast Furnace Gas Used As Fuel

USE of blast furnace gas in heating coke ovens and steel plant furnaces was discussed by F. B. Thacher, assistant general manager, By-Products Coke Corporation, Chicago, and A. J. Ebner, Freyn Engineering Co., Chicago, at the annual meeting of the Eastern States Blast Furnace and Coke Oven Association, held at the St. Clair Country Club, Pittsburgh, on June 7.

Mr. Thacher's paper described in detail the recent installation of his company, which makes the gas generated by the Federal stacks at South Chicago available for firing the coke ovens across the Calumet River, more than a mile away from the furnaces. This releases a large volume of coke oven gas, which can be sold as fuel at a considerably larger profit to the company. To accomplish this purpose it was necessary to carry the furnace gas under the Calumet River by tunnel. Cleaning equipment was installed; the paper dealt at some length with the results achieved, as well as the methods involved.

Mr. Ebner's paper was concerned largely with the use of blast furnace gas for heating steel plant furnaces. He stated that new and better gas cleaning methods must be evolved before any substantial progress can be made in enlarging the field of use for blast furnace gas.

Pointing out that future progress in this country will probably follow the experience of European countries, the paper brought out the fact that European plants have been using regenerative reheating furnaces for some time, a practice that was materially promoted by the use of the divisible flame type furnace, which utilizes lean fuels with regeneration of both air and gas. The advantage of this type of furnace lies in securing high pre-heat without undue sacrifice of heat available in the hearth for the heating of steel.

Officers Elected

W. A. Haven, Arthur G. McKee Co., Cleveland, was elected president of the association for the coming year. Before going with the McKee company earlier this year, he served for a number of years as superintendent of Northern furnaces for the Republic Iron & Steel Co., Youngstown.

J. E. Lose, elected vice-president, has served as secretary-treasurer of the association for the last year. Since April, 1928, he has been assistant general superintendent, Homestead works, Carnegie Steel Co., and has been identified with that company in various capacities since 1910. He will be succeeded as secretary-treasurer by H. P. Zeller, vice-president, Donner-Hanna Coke Corporation, Buffalo. Mr. Zeller has been identified with the Donner-Hanna company since its formation and was previously associated with the Toledo Furnace Co., Toledo, Ohio.

Pacific Coast

Cast Iron Pipe More Active—Demand for Other Products Has Slackened—Structural Awards 7000 Tons

SAN FRANCISCO, June 8. (By Air Mail).—Demand has slackened somewhat. New projects of size are slow in coming forth. The cast iron pipe market was the most active the past week, more than 3000 tons having been placed. A tabulation of building projects involving expenditures of \$100,000 or more shows 115 projects planned during May at a cost of \$47,880,000 compared with 82 projects totaling \$48,277,000 for the previous month. Structures awarded numbered 53 at a cost of \$15,975,000, compared with 46 awards and a cost of \$17,530,000 in April. Steel prices are holding fairly firm.

Pig Iron.—Movement of foundry pig iron is limited to small lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—While many small reinforcing steel bar awards were placed this week, there were only two calling for more than 100 tons. The Northwest Steel Rolling Mills booked 500 tons for the Mount Diablo dam in Seattle; 141 tons for paving work in Santa Ana, Cal., went to an unnamed interest. Bids were opened this week on 2000 tons for an addition to the City-County Building, Seattle. The California State Highway Commission opened bids this week on a number of paving and bridge projects which require upward of 600 tons and have issued calls for bids for more than 1000 tons. Prices continue unchanged in the bay district on out-of-stock material at 2.30c., base, on carload lots, and up to 2.60c. on smaller lots. In Los Angeles, prices are \$2 a ton higher. Merchant bar material remains at 2.35c., c.i.f.

Plates.—The Beall Tank & Pipe Co., Portland, secured 570 tons of ¼-in. plates for a 20-in. riveted steel pipe line for Walla Walla, Wash. Other lettings included 250 tons for tanks for the General Petroleum Corporation at Seattle, 200 tons for tanks for the Union Oil Co., Seattle, and 150 tons

for boiler breeching for the Snoqualmie Falls Timber Co., Snoqualmie Falls, Wash., all placed with the Seattle Boiler Works. Bids were opened this week on 500 tons for a penstock for the Mount Diablo power project, Seattle. Prices continue at 2.35c. c.i.f.

Shapes.—Structural shape awards totaled more than 7000 tons. The largest letting was 5000 tons for a hotel in Vancouver, B. C., placed with the Dominion Bridge Co. The Consolidated Steel Corporation took 240 tons for a machine shop for the Southern Pacific Co. and the Pacific Iron & Steel Co. booked 260 tons for a bridge in Los Angeles. A wharf for the General Petroleum Corporation at Ventura, involving 275 tons, went to the Bethlehem Steel Co. Bids were opened on 160 tons for the City-County Building addition in Seattle. Bids will be opened on June 26 for bridges over the Salinas and Trinity Rivers in California, involving 630 tons and 435 tons respectively. Plain material

remains firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—The weekly total of cast iron pipe bookings was the largest in more than 10 weeks. The United States Pipe & Foundry Co. took 2398 tons of 6-in. Class B pipe for Long Beach, Cal. Oceanside, Cal., placed 341 tons of 6 to 12-in. Class B pipe with the O. U. Miracle Construction Co., and, on another inquiry for 692 tons of 14 and 16-in. Class B pipe, decided on riveted steel and placed the order with the Western Pipe & Steel Co. The Western Roads Co. took 104 tons of 6-in. Class B pipe for Yuba City, Cal. San Diego, Cal., let 238 tons of 2 and 4-in. Class B pipe to the Butterfield Construction Co. Alhambra, Cal., has come into the market for 200 tons of 12 to 16-in. pipe. The Griffith Co. was low bidder on 117 tons of 4 to 10-in. Class C pipe for San Diego. Bids will be opened on June 24 for 208 tons of 4-in. Class C pipe for Los Angeles.

Steel Pipe.—The Ducommun Corporation, Los Angeles, was low bidder on from 142 to 180 tons of 8 or 10-in. standard black pipe for the La Canada Irrigation District, La Canada, Cal.

Cincinnati

Sheet Steel Bookings of Leading Independent Producers at 80 Per Cent of Capacity This Month—Pig Iron Dull

CINCINNATI, June 11.—Although local dealers booked few pig iron orders the past week, melters are taking iron on current contracts at a normal rate and are not expected to carry much stock over into the third quarter. Attention continues to center principally on prices, which are holding fairly well. In Southern iron, \$15, Birmingham, is the prevailing quotation on business in this district, although one or two furnaces are adhering to \$15.50. An Ironton, Ohio, producer is attempting to dispose of a small stock of high phosphorus iron at \$17, furnace, this low price being necessitated by competition from Southern makers. Northern Ohio sellers are reported to be asking \$18.50, furnace. An Ohio melter has bought 1000 tons of Southern iron for third quarter delivery. Inquiries include 1000 tons of foundry for the Norfolk & Western Railroad and 600 tons for a central Ohio consumer.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$18.89 to \$20.39
Ala. fdy., sil. 1.75 to 2.25 18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75 19.19
Tenn. fdy., sil. 1.75 to 2.25 19.19
S'th'n Ohio silvery, 8 per cent 27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Sheet steel bookings in the first 10 days of June were at the rate of about 80 per cent of capacity. The seasonal slackening in specifications by automobile manufacturers has had a depressing ef-

fect, although it has not been as serious as in the past few years. Sales of special grades of sheets have been of substantial volume. Prices are firmly maintained. A large district maker has booked liberal tonnages of metal furniture stock at 4.20c., Pittsburgh. A district producer has reduced fender stock from 4.35c. to 4.25c., Cleveland or Pittsburgh. Sales of bars, shapes and plates have been only fair. Fabricators are badly in need of work.

Warehouse Business.—In view of the fact the Louisville jobbers are selling common wire nails as low as \$2.50 per keg, local warehouses have reduced prices from \$2.95 to \$2.85.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinfrc. bars	3.15c.
Rail steel reinfrc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	3.75
Net per 100 Ft.	
Lap-weld steel boiler tubes, 2-in.	\$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ½-in. and over	3.15c.
Small angles, under ½-in.	3.55c.
Small channels and tees, ¼-in. to 2½-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	\$3.40
Cement c't'd nails, 100 lb. keg	3.40

Coke.—The Buick Motor Car Co. is inquiring for by-product or beehive foundry coke to satisfy its last half requirements. Specifications for by-product foundry coke by automobile companies have fallen off somewhat, and in one notable instance shipments have been temporarily suspended. However, this decline has been partially offset by the steady demand from other classes of consumers. Prices are unchanged, with by-product foundry coke selling at \$10.05, delivered Cincinnati.

Old Material.—With the market maintaining its position fairly well, there has been little, if any, change in the past week. While consumers are placing orders sparingly, the supply of scrap is not large and dealers are having to pay good prices for ma-

terial. The only weakness is in cast iron grades, which are sluggish. Railroad lists closing this week include the Southern, Louisville & Nashville and Chesapeake & Ohio.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting.....	13.75 to 14.25
Loose sheet clippings.....	9.25 to 9.75
Bundled sheets.....	10.50 to 11.00
Cast iron borings.....	9.00 to 9.25
Machine shop turnings.....	8.50 to 8.75
No. 1 busheling.....	10.50 to 11.00
No. 2 busheling.....	6.75 to 7.00
Rolls for rolling.....	14.50 to 15.00
No. 1 locomotive tires.....	14.25 to 14.75
No. 2 railroad wrought.....	13.00 to 13.50
Short rails.....	18.50 to 19.00
Cast iron car wheels.....	12.75 to 13.25
No. 1 machinery cast.....	19.25 to 19.75
No. 1 railroad cast.....	15.25 to 15.75
Burnt cast.....	10.25 to 10.75
Stove plate.....	10.25 to 10.75
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	15.25 to 15.75
Agricultural malleable.....	14.25 to 14.75

Boston

Heavy Melting Steel Scrap Higher and Scarce—Pig Iron Sales Are Slow—Prices Weaker

BOSTON, June 11.—Pig iron sales the past week did not exceed 3000 tons, as against about 5500 tons the previous week. The inactivity of the market is ascribed to a falling off in the New England melt and the comfortable position of foundries as regards stocks on hand and on contract. Despite the indifference of buyers, the Mystic Iron Works is securing prices better than the equivalent of \$18.50 a ton, Buffalo furnace, for No. 2X, and so far this year has shipped considerably more iron than it has made. Buffalo furnaces generally hold firmly to \$18.50 a ton, furnace, for No. 2X and No. 2 plain, but quotations as low as \$17.50, Buffalo, have been made. Less activity is noted in Southern iron, users having contracted for needs running into third quarter.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$22.41 to \$23.41
*Buffalo, sil. 2.25 to 2.75..	22.91 to 23.91
East Penn., sil. 1.75 to 2.25	25.15
East Penn., sil. 2.25 to 2.75	25.65
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
Ala., sil. 1.75 to 2.25.....	21.91 to 24.27
Ala., sil. 2.25 to 2.75.....	22.41 to 24.77

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Cast Iron Pipe.—With most Northern foundries well sold ahead, there is less inclination to cut cast iron pipe prices. Prices quoted openly are as follows: 4-in., \$47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$43.10, and 16 to 20-in., \$42.10. Newton, Mass., has awarded 300 tons of 6 and 8-in. pipe to R. D. Wood & Co., and that foundry will supply 350 tons of 6 and 8-in. for a Wayland, Mass., job. The United States Pipe & Foundry Co. has sold 150 tons of 6 and 10-in. pipe to Marlboro, Mass. Private business was good the past week and included 3000 tons of 42-in. and 3000 tons of 6-in. pipe.

East Providence, R. I., is in the market for 120 tons of 6 and 8-in. stock, and Boston for a small tonnage of 12 and 16-in. Woodville, N. H., will call for bids on a round tonnage of 10 and 12-in. pipe. Ossipee, N. H., will buy 6-in.

Reinforcing Bars.—The Concrete Steel Co. has taken 210 tons of billet steel reinforcing bars for a local job. About 350 tons for an Atlantic & Pacific Tea Co. job will probably be placed this week. Small awards in the past week totaled not more than 200 tons, with distributors holding well to 2.66½c. per lb., base, from stock. No round tonnages of rail steel bars were reported sold this week, but about 1000 tons is in prospect. The openly quoted price for such bars is 2.26½c. per lb., base, delivered

Warehouse Prices, f.o.b. Boston

Base per Lb.	
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Spares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

common Boston freight rate points, but concessions of \$2 a ton or more are offered even on less than 100-ton lots.

Coke.—For the first time this year an appreciable decrease in by-product foundry coke contract specifications is noted. The price of such fuel remains at \$11 a ton, delivered within a \$3.10 freight rate zone.

Old Material.—No. 1 heavy melting steel is \$11.75 to \$12 a ton on cars shipping point, up 25c. a ton from a week ago and the first advance in that material in months. The advance is due to a better feeling in the Pittsburgh market and to a scarcity of material in New England. Scrap rails have gone up 25c. to 50c. a ton, and steel mill borings 25c., while the market for long bundled skeleton is firmer. The better prices on these materials so far have failed to result in larger shipments to consuming points. The real feature of the market, however, is that, with the exception of specification pipe and railroad and yard wrought, practically all materials are moving to some extent, whereas shipments recently have been confined to a few grades. A steamer has completed loading 2300 tons of scrap here for Danzig, and has 700 tons also from Canada. Another steamer is due to arrive June 25 to load 3500 tons for Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.75 to \$12.00
Scrap T rails.....	11.25 to 11.50
Scrap girder rails.....	10.25 to 10.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 yard wrought.....	9.50 to 10.00
Machine shop turnings.....	6.50 to 6.60
Cast iron borings (steel works and rolling mill).....	6.25 to 6.50
Bundled skeleton, long.....	9.00 to 10.00
Forged flashings.....	10.00 to 10.50
Blast furnace borings and turnings.....	6.00 to 6.25
Forge scrap.....	8.75 to 9.00
Shafting.....	14.00 to 14.25
Steel car axles.....	16.50 to 17.00
Wrought pipe 1 in. in diameter (over 2 ft. long).....	10.50 to 10.75
Rolls for rolling.....	12.00 to 12.50
Cast iron borings, chemical.....	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$14.50 to \$14.75
No. 1 machinery cast.....	16.00 to 16.50
No. 2 machinery cast.....	14.00 to 14.50
Stove plate.....	11.50 to 12.00
Railroad malleable.....	18.50 to 19.00

Detroit Scrap Price Trend Is Downward

DETROIT, June 11.—Heavy melting and shoveling steel and hydraulic compressed scrap declined 25c. a ton during the past week, with other grades selling at about the average of the ranges quoted below. The offerings of the producers in the Detroit district are being bought by Lake mills and furnaces for boat shipment.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$13.75 to \$14.25
Borings and short turnings.....	9.00 to 9.50
Long turnings.....	7.00 to 7.50
No. 1 machinery cast.....	13.00 to 13.50
Automobile cast.....	12.00 to 13.50
Hydraul. comp. sheets.....	13.50 to 14.00
Stove plate.....	9.50 to 10.00
New No. 1 busheling.....	12.00 to 12.50
Old No. 1 busheling.....	11.00 to 11.50
Sheet clippings.....	8.50 to 9.00
Flashings.....	12.00 to 12.50

Birmingham

Pig Iron Melters Delay Buying for Third Quarter—Steel Mill Backlogs Still Heavy

BIRMINGHAM, June 11.—Pig iron sales, though in fair volume, are almost entirely for spot delivery. Inquiries for third quarter iron show no appreciable gain. Melters are apparently waiting for a more definite indication of future prospects before committing themselves for the next quarter. Prices are unchanged at \$15 for outside points and \$15.50 for the Birmingham district. Stocks on furnace yards show little change. Of the 17 furnaces in operation, 11 are on foundry, five on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil. \$15.00 to \$15.50
No. 1 fdy., 2.25 to 2.75 sil. 15.50 to 16.00
Basic 15.00 to 15.50

Finished Steel.—New business is not showing the weekly gains that were characteristic in May, but orders on the books are as large as they have been at any time this year. Inquiries continue strong, and the outlook for the remainder of June is unusually good. The volume of rail inquiries in the past two weeks was larger than for the four preceding months. With one or two exceptions, finishing mills are operating at capacity rates. The new cotton tie mill of the Tennessee company was placed in operation last week. Steel quotations are unchanged. Small orders for fabricated structural steel continue good, but no large awards have been made. A good tonnage for a dirigible hangar at Gadsden, Ala., has been temporarily withdrawn from the market. Reinforcing bar awards in small tonnages are steady. The total of 21 active open-hearths is the highest of the year.

Cast Iron Pipe.—Large orders have been scarce, but small sales are developing at a rate above the May average. Inquiries indicate that several good-sized projects will be up for figures before the end of the month. Operations are being increased by one company. Others are maintaining a steady output. The United States Pipe & Foundry Co. was awarded the project at Memphis requiring 30,000 ft. of 6-in. pipe. A project at Griffin, Ga., will require about nine miles of 16 to 20-in. pipe. Prices remain at \$37 to \$38 for 6-in. and larger diameters.

Coke.—Regular contract buyers continue to renew contracts for third and fourth quarter foundry coke, the base price being \$5. The movement of coke is a little more satisfactory. There is a fair demand from the Middle West.

Old Material.—The market has gained strength in the steel grades, but has lost strength in the cast iron grades. Scrap steel rails and heavy melting steel are moving better than at any time in recent weeks. Cast iron scrap is the dullest it has been in months. Quotations are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	13.00
Short shoveling turnings..	9.00
Cast iron borings.....	9.00
Stove plate	13.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought...\$10.00 to	10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	14.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

Buffalo

Pig Iron on More Competitive Basis in New England—Steel Plants Still Operating Full

BUFFALO, June 11.—While the price of foundry pig iron in the immediate Buffalo district appears to be firm at \$19.50, base, the quotations for shipment outside the district are subject to concessions. These have ranged down to \$18 on some tonnages sold in New England and in lower New York State and New Jersey, and it is intimated that lower prices may be quoted in New England to meet growing competition from Southern and foreign irons. In one quarter it is stated that \$17 quotations by at least one producer are not unlikely. May developed into a good pig iron month, most of the Buffalo interests having sold as much iron as they made. Since June 1 the market has not been active in important buying, but small tonnages have been fairly numerous. A fifth blast furnace has been rebuilt at the Sus-

quehanna plant of the Hanna Furnace Co., but will not be put in service for the present. A record for pig iron production was attained at the Lackawanna plant of the Bethlehem Steel Co. in May.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25 \$18.50 to \$19.50
No. 2X fdy., sil. 2.25 to 2.75. 19.00 to 20.00
No. 1 fdy., sil. 2.75 to 3.25. 20.00 to 21.00
Malleable, sil. up to 3.25. 19.00 to 20.00
Basic 17.50 to 18.50
Lake Superior charcoal.... 27.28

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars	2.95c.
Cold-fn. flats, sq. and hex.....	4.45c.
Rounds	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

Finished Iron and Steel.—Operations of steel mills in this territory continues at the same gait as heretofore. Last week the Lackawanna plant of the Bethlehem Steel Co. operated 22 out of 24 open-hearths; Donner Steel Co., eight out of nine; Wickwire Spencer Steel Co., three out of four. The Seneca Iron & Steel Co. operated at 90 per cent. Donner open-hearths established a record in May, 45,087 tons of ingots, and the blooming mill produced 41,692 tons. The demand for all lines of finished material is good. Bids for the general contract for the new City Hall, which will require 7000 to 8000 tons of structural steel, will be opened the week of June 17.

Old Material.—The feature of the market during the past week was the purchase of a considerable tonnage of heavy melting steel by the largest consumer in the district at \$16 for No. 1 and \$14.50 for No. 2. As usual, most of the scrap shipped will be No. 2 grade. Aside from this development, there was little activity, although consumption continues at a high rate, and there is little scrap in dealers' yards. Some of the material from the railroad lists which closed the week before last came to Buffalo, and it is understood that the highest paid for the No. 1 heavy melting steel for Buffalo delivery was \$16.85. Dealers are buying freely at \$14.25 against a previous unfilled order of No. 2 steel by the consumer which has just made the above-mentioned purchase. The market for stove plate and No. 1 machinery cast scrap is weak, and there are no transactions except for an occasional car of No. 1 cast. The principal consumer of this grade will probably be out of the market for some time to come. There have been some small sales of knuckles and couplers, rolled steel wheels and short steel rails.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$16.00 to \$17.00
No. 2 heavy melting steel.....	14.50
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets.....	14.50 to 14.75
Hand bundled sheets.....	12.00 to 12.50
Drop forge flashings.....	14.75 to 15.00
No. 1 busheling.....	15.50 to 16.50
Hvy. steel axle turnings.....	14.00 to 14.50
Machine shop turnings.....	7.50 to 7.75
No. 1 railroad wrought... 13.00 to	13.50
Acid Open-Hearth	
Knuckles and couplers....	19.00
Coil and leaf springs.....	19.00
Rolled steel wheels.....	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings. 12.00 to	12.50
Blast Furnace Grades	
Short mixed borings and turnings	10.50 to 11.50
Cast iron borings.....	10.50 to 11.50
No. 2 busheling.....	10.00 to 10.50
Rolling Mill Grades	
Steel car axles.....	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast.....	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars.....	12.50 to 13.00
Steel rails, 3 ft. and under 19.00 to	19.50
Cast iron carwheels.....	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical borings	12.50 to 13.50

St. Louis

Pig Iron Buying for Third Quarter Delayed — Steel Demands Active and Backlogs Are Large

ST. LOUIS, June 11.—Buying of pig iron continues extremely light, although sales of the last week showed a slight improvement over those of the preceding period. Most melters are showing no interest in third quarter requirements, and it is estimated that not more than 10 per cent of such requirements has been placed. One of the causes for this delay in buying is the uncertainty growing out of the proposed reduction of 73c. a ton in the freight rate from Birmingham to St. Louis. Sales of the St. Louis Gas & Coke Corporation for the week amounted to 3550 tons, including 1000 tons each to an Illinois wheel maker and to a car manufacturer in the district, and 800 tons of malleable iron in scattered lots. Shipments are well maintained.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$20.00
Malleable, f.o.b. Granite City.....	20.50
N'th'n No. 2 fdy., deliv'd St. Louis..	23.16
Southern No. 2 fdy., deliv'd.....	19.42 to 19.92
Northern malleable, deliv'd.....	22.16
Northern basic, deliv'd.....	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke. — Shipments of industrial grades to water gas and public utilities are on a large scale. Lead and zinc interests are taking heavy tonnages.

Finished Iron and Steel.—All units of the Granite City Steel Co. are operating to full capacity, except the galvanized department, which is at 70 per cent. The high operations have been made possible by the increased demand for tin plate and blue annealed sheets within the last few weeks. The company has a backlog of orders for nine weeks on blue annealed, six to seven weeks on plates, four weeks on sheets and about four weeks on tin plate. Warehouse business was slightly better in May than in April. Delays in receiving mill shipments caused consumers to turn to warehouses for material. A five-weeks' strike of 3500 building laborers

has been settled, but 700 structural iron workers are still out.

Old Material.—The scrap market is only fairly active. There has been some buying by consumers in the district, but prices are not attractive to dealers. Shipments of old materials from the South are heavier, although insufficient to affect the situation one way or the other. Railroad lists include: Pennsylvania, 55,035 tons; Santa Fe, 5230 tons; Missouri-Kansas-Texas, 6600 tons; Wabash, 3144 tons; Southern Pacific, 2595 tons; Rock Island, 175 carloads; Great Northern, 47 carloads; Chicago & Eastern Illinois, 16 carloads, and Nashville, Chattanooga & St. Louis, 10 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires.....	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart...	15.00 to 15.50
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought.....	13.25 to 13.75
No. 1 busheling.....	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling.....	15.50 to 16.00
Machine shop turnings....	8.00 to 8.50
Heavy turnings.....	9.75 to 10.00
Steel car axles.....	19.00 to 19.50
Iron car axles.....	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought.....	13.50 to 14.00
Steel rails, less than 3 ft..	16.50 to 17.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.25 to 14.75
No. 1 machinery cast.....	15.50 to 16.00
Railroad malleable	15.75 to 16.25
No. 1 railroad cast.....	15.00 to 15.50
Stove plate	11.75 to 13.25
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Canada

Steady Flow of Steel Business in Dominion

TORONTO, ONT., June 11.—The flow of new business in steel is steady. This, with present backlogs, assures the continuance of high operations well up to the end of the year. Steel production is close to capacity in most departments.

The Algoma Steel Corporation reported three new records in production for May. The 18-in. mill turned out 7498 tons, against the previous record of 6392 tons in February. The 32-in. billet mill produced 11,404 tons, compared with the former record of 10,223 tons made in April, and the coke oven produced 53,712 tons, compared with the former record of 52,264 tons in March.

Pig Iron.—The opening of books for third quarter has resulted in increased buying of merchant pig iron in the Canadian markets. While there is no rush to cover, many melters are com-

ing quietly forward with contracts of a substantial tonnage for future delivery, and others are showing keen interest. Inquiries are fairly numerous and indicate extensive third quarter buying before the end of this month. Tonnages on second quarter account to be carried over into third quarter are expected to be small when compared with other quarters of the past two or three years. The spot demand has also shown renewed activity. Current sales, spot and future, are being made at \$24.10, Toronto, and the majority in the Montreal market are at \$25.50. Basic iron sales, confined to small tonnages, are at \$24.50, Montreal.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.	\$24.10 to \$24.60
No. 2 fdy., sil. 1.75 to 2.25.	24.10 to 24.60
Malleable	24.10 to 24.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.	\$25.50 to \$26.00
No. 2 fdy., sil. 1.75 to 2.25.	25.50 to 26.00
Malleable	25.50 to 26.00
Basic	24.50 to 25.00

Imported Iron, Montreal Warehouse	
Summerlee	\$33.50
Carron	33.00

Structural Steel.—Business is developing on a larger scale in western Canada, and a number of promising contracts are in prospect. The Alberta Department of Public Works has announced a program of bridge construction for this year requiring about 10,000 tons of steel. Bridge construction programs by other provincial governments and the railroads will swell the quantity required on this account by upward of 50,000 tons. The prospective demand for structural steel is the largest in volume in Canada's history.

Old Material.—While business for the week was mostly in small individual orders, the total contracted for was comparatively high. There is a shortage of machinery cast and stove plate in the Toronto market. Montreal dealers are experiencing difficulty in procuring wrought scrap and steel axles. Some improvement was noted in steel scrap sales for the week, but iron grades are in the best demand.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	\$10.00	\$8.50
Rails, scrap	11.00	9.00
No. 1 wrought.....	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron.	17.00	22.00
No. 1 machinery cast	17.00	17.00
Stove plate	13.00	13.00
Standard carwheels..	16.00	16.00
Malleable	13.00	13.00
Per Net Ton		
No. 1 mach'y cast..	\$16.00	....
Stove plate	12.00	....
Standard carwheels..	15.00	....
Malleable scrap	14.00	....

Illinois Manufacturers' Association moved June 4 to its new location in the State Bank Building, 120 South LaSalle Street, Chicago. This year marks the thirty-fifth anniversary of the organization.

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.25c.
Galv. sheets (No. 24).....	5.10c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.30c.
Galv. corrug. sheets.....	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
Per Cent Off List	
Tank rivets, 1/2-in. and smaller, 100 lb. or more	65
Less than 100 lb.....	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Fabricated Structural Steel

Largest Awards of Year, 88,000 Tons, Include Russian Tractor Plant—New Projects Total 16,000 Tons

AWARDS of structural steel reached 88,000 tons the past week, the largest tonnage within one week this year. A large part of this total was made up of 34,000 tons for New York subways, 8000 tons for a tractor plant in Russia, 5000 tons for a hotel in Vancouver, B. C., and 6500 tons for the LaSalle-Wacker Building in Chicago. New projects, which totaled only about 16,000 tons, include 4000 tons for catenary supports for electrification on the Delaware, Lackawanna & Western Railroad and 3000 tons for a locomotive and car repair shop for the New York Central Railroad. Awards follow:

BOSTON, 400 tons, hangar for Goodyear Tire & Rubber Co., to Austin Co.
 STATE OF VERMONT, 275 tons, highway bridge at Richford, to Pittsburgh-Des Moines Steel Co.
 TORRINGTON, CONN., 675 tons, Charlotte Hungerford Hospital, to American Bridge Co.
 WATERTOWN, CONN., 400 tons, Taft School building, to Berlin Construction Co.
 NEW YORK, 3800 tons, building for International Telephone Co., to A. E. Norton Co.
 NEW YORK, 34,000 tons, subway sections 1 and 2, route 103, Houston and Essex Streets, awarded by Corson Construction Co. to American Bridge Co.
 NEW YORK 1200 tons, public school No. 11 in Bronx, 300 tons, and public school No. 10 in Brooklyn, 900 tons, to Easton Structural Steel Co.; previously reported to Hedden Iron Construction Co.
 NEW YORK, 400 tons, Valley Stoker Home for Aged, to Hedden Iron Construction Co.
 NEW YORK, 400 tons, New York Central Railroad widening of Park Avenue, to Phoenix Bridge Co.
 NEW ROCHELLE, N. Y., 950 tons, office building, to Easton Structural Steel Co.
 ALBANY, N. Y., 2400 tons, National Savings Bank building, to American Bridge Co.
 ALBANY, 400 tons, five steel scows for State canal work, to Midland Barge Co.
 BOWMANVILLE, ONT., 125 tons, addition to Collegiate Institute, to Sarnia Bridge Co., Sarnia.
 MONTREAL, 100 tons, store for Kresge Co. of Canada, Ltd., to Dominion Bridge Co., Lachine.
 TRENTON, N. J., 620 tons for John A. Roebling Sons Co., to Belmont Iron Works.
 ROEBLING, N. J., 725 tons for Roebling company, to McClintic-Marshall Co.
 STATE OF NEW JERSEY, 105 tons, highway bridge over Walkkill River, to Phoenix Bridge Co.
 LOCUST SUMMIT, PA., 1700 tons, coal breaker for Philadelphia & Reading Coal Co., to Lehigh Structural Steel Co.
 READING RAILROAD, 141 tons, two bridges at Locust Summit, to Bethlehem Fabricators, Inc.
 PHILADELPHIA, 1000 tons, senior high school, forty-second ward, to McClintic-Marshall Co.
 STATE OF PENNSYLVANIA, 250 tons, highway bridges, to Shoemaker Bridge Co.
 PITTSBURGH, 1900 tons, Pennsylvania Railroad freight sheds, to McClintic-Marshall Co.
 WEST HOMESTEAD, PA., 550 tons, mill building for Standard Steel Propeller Co., to McClintic-Marshall Co.
 WESTERN MARYLAND RAILROAD, 235 tons, bridge at Hagerstown, Md., to McClintic-Marshall Co.
 ELIZABETHTON, TENN., 2275 tons, building for American-Glanzstoff Corporation, to McClintic-Marshall Co.
 CLEVELAND, 300 tons, station canopies for Cleveland Union Terminals Co.

NEWARK, OHIO, 1125 tons, Baltimore & Ohio bridge, to Mount Vernon Bridge Co.
 CHICAGO, 6500 tons, La Salle-Wacker Building, to American Bridge Co.
 CHICAGO, 700 tons, W. F. Hall Printing Co., to A. Bolter's Sons, local.
 CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 150 tons, to an unnamed bidder.
 ROCKFORD, ILL., 500 tons, factory building, to American Bridge Co.
 MINNEAPOLIS, 850 tons, Kresge store, to American Bridge Co.
 OMAHA, NEB., 450 tons, viaduct for Union Pacific, to American Bridge Co.
 STATE OF COLORADO, 450 tons, highway bridges, to American Bridge Co.
 SAN FRANCISCO, 240 tons, machine shop for Southern Pacific Co., to Consolidated Steel Corporation.
 SAN FRANCISCO, 150 tons, factory addition, Fifteenth and Bryant Streets, to Western Iron Works.
 VENTURA, CAL., 275 tons, wharf for General Petroleum Corporation, 200 tons to Bethlehem Steel Co. and 75 tons to Pacific Iron & Steel Co.
 LOS ANGELES, 260 tons, bridge on Vine-land Avenue, to Pacific Iron & Steel Co.
 SEATTLE, 250 tons plates, tanks for General Petroleum Corporation to Seattle Boiler Works.
 SEATTLE, 200 tons plates, tanks for Union Oil Co., to Seattle Boiler Works.
 SNOQUALMIE FALLS, WASH., 150 tons plates, boiler breeching for Snoqualmie Falls Timber Co., to Seattle Boiler Works.
 WALLA WALLA, WASH., 570 tons plates, 20-in. riveted pipe, to Beall Tank & Pipe Co.
 VANCOUVER, B. C., 5000 tons, hotel, to Dominion Bridge Co.
 RUSSIA, 8000 tons, tractor plant, reported placed with McClintic-Marshall Co.; Alva Kahn, engineer.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARTFORD, CONN., 200 tons, sales and service station.
 BOSTON, Hyde Park district, 100 tons, Edison Electric Illuminating Co. garage and stock building.
 SPRINGFIELD, MASS., 450 tons, hangar.
 BROOKLYN, 900 tons, building for Flat-bush Branch of Y. M. C. A.
 NEW YORK, 625 tons, Nurses' Home at St. Marks Hospital, East Thirteenth Street.
 NEW YORK, 1300 tons, addition to Hotel Wellington; bids in.
 STATE OF NEW YORK, 550 tons, highway bridges.
 DELAWARE, LACKAWANNA & WESTERN RAILROAD, 4000 tons, catenary supports.
 NEW YORK CENTRAL RAILROAD, 3000 tons, locomotive and car repair shop at Harmon, N. Y.
 BALTIMORE, 2100 tons, factory for Procter & Gamble Co.; general contract to Frainie Brothers & Haisley, Baltimore.

TONAWANDA, N. Y., 500 tons, New York State highway bridge.
 BUFFALO, 1000 tons, Michigan Street lift bridge.
 CLEVELAND, 1000 tons, County jail.
 MARIETTA, OHIO, 150 tons, warehouse for United States Government; general contract to Ohio Valley Construction Co.
 MADISON, WIS., 600 tons, field house for University of Wisconsin.
 CHICAGO 500 tons, office building at 430 North Michigan Boulevard.
 LOGAN, IOWA, 450 tons, highway bridge.
 KANSAS CITY, MO., 1200 tons, Professional Building.
 SEATTLE, 500 tons plates, penstock for Mount Diablo power project; Rumsey & Jordan, low bidder.

Railroad Equipment

New York Central Buys 150 Locomotives

AWARD by the New York Central Railroad of 150 locomotives to the American Locomotive Co. was the outstanding feature of the week's railroad equipment buying. The only locomotive inquiries reported are four for the Bangor & Aroostook Railroad. Of a total of 375 cars bought, 300 were placed by the Columbus & Greenville Railroad. The Buffalo & Susquehanna Railroad is inquiring for 200 all-steel hopper cars. Details follow:

The New York Central has placed one of the largest locomotive orders in years, 150 engines, 75 of the Mohawk type and 75 of the Hudson type. The entire order went to the American Locomotive Co. The New York Central ordered 100 locomotives early last January. This railroad is reported to be in the market for 42 electric locomotives.

Bangor & Aroostook is inquiring for four locomotives.

Boston & Maine may buy 500 box cars. Buffalo & Susquehanna has inquired for 200 all-steel hopper cars.

Fruit Growers Express has ordered 172 steel underframes from Ryan Car Co.

Columbus & Greenville has ordered 300 box cars from American Car & Foundry Co.

Pennsylvania will build three dining cars, 50 caboose cars, four cafe coaches and 25 horse express cars at its Altoona shops.

Edward Hines Lumber Co. has ordered one locomotive from Baldwin Locomotive Works and 200 logging cars from an unnamed bidder.

Office Removals

Jervis B. Webb Co., manufacturer of conveyors, announces the removal of its offices in Detroit from 7644 Woodward Avenue to 2921 East Grand Boulevard, where it has occupied the entire second floor. The plant remains at 9051 Alpine Street, Detroit.

Frank D. Carney, L. P. Ross and Harrison Souder, consulting engineers, have moved to 27 Pine Street, New York, pending completion of the new Bank of Manhattan Building, where they will have offices.

Chicago and Pittsburgh branches of the American Hoist & Derrick Co. have been moved. The Chicago office is now at 1000 Engineering Building, 205 West Wacker Drive, and the Pittsburgh office is at 901 Farmers Bank Building.

Non-Ferrous Metal Markets

Copper More Active and Stronger, Tin Sales Larger and Prices Higher, Lead Demand Good at Steady Prices, Zinc Quiet but Firmer

NEW YORK, June 11.

Copper.—A decidedly better sentiment pervades the market. Buying by foreign consumers has been quite active the past few days, sales on some days exceeding 2000 tons. For the month to date 11,250 tons has been sold abroad. It is estimated authoritatively that foreign buyers must still buy 26,000 gross tons for June, 47,000 tons for July and 53,000 tons for August. Domestic consumers are buying quite sparingly. Demand is a little more active and a feature is new business for spot and June shipment for both electrolytic and Lake copper, indicating that consumers are not fully covered for nearby metal. They are, however, buying only what is necessary, awaiting the May statistics which will be made public tomorrow. These, it is stated, will probably show an increase in stocks of refined metal. A heavier demand from abroad is expected to develop gradually, followed by more active buying in this country. The price situation is very firm, but an advance is not favored. Electrolytic copper is quoted unchanged at 18c., delivered in the Connecticut Valley, with the quotation of Copper Exporters, Inc., at 18.30c., c.i.f. usual European ports. The primary producers are still out of the market but are expected to be active soon. One or two, however, are taking a little business for special shapes for prompt shipment. Consumers are taking every pound available on contracts and in several cases future shipments have been anticipated. One Lake producer states that most of its high-priced metal has already been delivered, some of it scheduled for shipment in July. Shipments for May are expected to show a very large total. Lake copper is moderately active and is still quoted at 18c. or 18.12½c., delivered. Curtailment in mine output continues, one large company having effected a reduction of 25 per cent.

Tin.—Because of the activity of some London interests known as "the group," which has in the past week sent out both in London and in New York certain statements to the press and otherwise, outlining plans for a combination of producers and a stabilization or "control" of the market, there has been more activity and

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	June 11	June 10	June 8	June 7	June 6	June 5
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*.....	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	44.50	44.62½	....	44.00	43.82½	43.50
Zinc, East St. Louis.....	6.65	6.60	6.60	6.60	6.60	6.60
Zinc, New York.....	7.00	6.95	6.95	6.95	6.95	6.95
Lead, St. Louis.....	6.80	6.80	6.80	6.80	6.80	6.80
Lead, New York.....	7.00	7.00	7.00	7.00	7.00	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	23.25c.
Copper, hot rolled.....	26.75c.
Zinc	10.25c.
Lead (full sheets).....	11.00c. to 11.25c.
Seamless Tubes—	
High brass	28.25c.
Copper	29.25c.
Rods—	
High brass	21.25c.
Naval brass	24.00c.
Wire—	
Copper	19.87½c.
High brass	23.75c.
Copper in Rolls.....	26.75c.
Brazed Brass Tubing.....	30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled.....	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes.....	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes.....	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open.....	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	46.50c. to 47.50c.
Tin, bar	48.50c. to 49.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig.....	7.75c. to 8.25c.
Lead, bar	9.75c. to 10.25c.
Antimony, Asiatic	11.00c. to 11.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	30.00c. to 40.00c.
Solder, ½ and ½.....	30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	48.00c.
Tin, bar	50.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig.....	7.75c. to 8.00c.
Lead, bar	10.00c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	19.00c.
Babbitt metal, high grade.....	52.00c.
Solder, ½ and ½.....	30.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	14.00c.	16.00c.
Copper, hvy. and wire	13.75c.	15.25c.
Copper, light and bottoms	12.00c.	13.00c.
Brass, heavy.....	8.25c.	9.00c.
Brass, light.....	7.00c.	8.00c.
Hvy. machine composition	11.25c.	12.50c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings ..	11.00c.	12.00c.
Lead, heavy.....	5.50c.	6.00c.
Lead, tea.....	4.50c.	5.50c.
Zinc	3.50c.	4.25c.
Sheet aluminum.....	14.00c.	15.00c.
Cast aluminum.....	12.50c.	14.50c.

higher prices here and abroad. About 1000 tons of Straits tin was sold in the week ended June 8, but it was largely speculative buying. The bulk of the trading was on Thursday and Friday, June 6 and 7. Only a little metal was bought by consumers, who apparently are well covered ahead. Some leading London houses, according to information received here, discredit the movement which has been started by the group referred to. Prices in London, as a result of the London propaganda, have reached higher levels and today are about £4 per ton above those of a week ago, with spot standard quoted at £202 5s., future standard at £205 5s. and spot Straits at £205. The Singapore price today is £209. Spot Straits tin today in New York was quoted at 44.50c., in a very quiet market.

Lead.—Prices are unchanged from a week ago at 6.80c., St. Louis, and 7c., New York, the latter being the contract quotation of the leading interest. Demand is moderate and prices are a little steadier at St. Louis because of the disappearance of some lots which were available at a slight concession under 6.80c. Most of the demand is for June delivery, for which position a large quantity is still to be bought, and the amount for July shipment still unbooked is large. Sales today have been fairly good, some extending into August.

Zinc.—Lots of prime Western zinc, which have been available for several weeks at concessions, have nearly disappeared and the tone of the market is considerably stronger. Some producers are still adhering to 6.80c., East St. Louis, and taking some business, but the bulk of the demand, which is still light, is being satisfied at around 6.65c., as against 6.55c. to 6.60c. a few days ago. Some fair-sized sales are reported at 6.65c., and the delivery involved is mostly nearby metal. Ore prices at Joplin are still unchanged at \$44 per ton and the sales last week were 11,140 tons, which is the largest for any week since April 6. Production of ore increased to about 12,500 tons for the week, neutralizing recent curtailment. Shipments were fairly large at 12,190 tons, which is an increase over recent weeks. Stocks are estimated at about 35,600 tons.

Antimony.—The market is a little stronger and steadier because Chinese exchange is a little more stable. Chinese metal is quoted at 9c. per lb., duty paid, New York, for all positions.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 11.—New buying is spotty. Prices are strong with advances noted in tin and zinc. The

old metal market is unusually quiet and prices are nominal.

Prices per lb., in carload lots: Lake copper, 18.12½c.; tin, 45.75c.; lead, 6.90c.; zinc, 6.75c.; in less-than-carload lots: antimony, 10c. On old metals we quote copper wire, crucible shapes and copper clips, 14.50c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Record Tin Production in Malay States

WASHINGTON, June 11.—Malayan figures show a 1928 production of 64,459 tons of tin, of which 61,935 tons came from the Federated Malay States, the highest ever recorded, according to a report received from the American consul general at Singapore. Since 1893, the earliest year for which accurate statistics are available, the Federated Malay States have produced a total of 1,630,735 tons of tin, the annual output having grown steadily from 39,912 tons, the first figure reported, to the record production of last year. The value of the total production, based on the tin price each year, is estimated at \$276,746,275 (\$1,341,219,434).

Prices of Brass in Ingots in May

CHICAGO, June 1.—The Non-Ferrous Ingot Metal Institute reports below the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ending May 24. As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed below is a compilation representing numerous sales of metal known to the trade by the designation shown but each item, in reality, including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following designations will be understood to refer to "commercial grades":

Commercial 80-10-10 (1 per cent impurities)	17.465c.
Commercial 78 per cent metal....	15.624c.
Commercial 81 per cent metal....	15.767c.
Commercial 83 per cent metal....	16.096c.
Commercial 85-5-5.....	16.392c.
Commercial No. 1 yellow brass ingot	13.565c.

Unfiled Machine Tool Orders Higher

Unfiled orders for machine tools reached a new high point in May, according to figures just announced by the National Machine Tool Builders' Association. The May index stood at 721, as compared with 718 in April.

Shipments during May dropped to 300 from 311 in April. Gross orders last month showed a gain over April, the index standing at 334.3, as compared with 319.7 for the previous month. The three months' average compiled by the association changed only slightly, the May figure being 329.5, as compared with 330.0 in April.

Reinforcing Steel

Awards and New Projects in Small Volume

New projects reported for the week call for about 3300 tons, the largest, 950 tons, being for an apartment house at Chicago. Awards totaled about 2900 tons, one of the smallest tonnages for the year. Lettings were as follows:

BOSTON, 210 tons, Children's Hospital unit, to Concrete Steel Co.
 BOSTON, 200 tons, printing plant for Houghton-Mifflin Co., from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.
 NEW YORK, 500 tons, Bank of Manhattan, 40 Wall Street, to Concrete Steel Co.; previously reported as 100 tons.
 BROOKLYN, 750 tons, sewer construction, to Tidewater Structural Materials Corporation.
 PITTSBURGH, 125 tons, Fourth Avenue garage addition, to Electric Welding Co.; Edward Crump, Jr., contractor.
 BLOOMSBURG, PA., 300 tons, rail steel bars, manufacturing building for Magee Carpet Co., to Gilmour-Roslyn Steel Co.
 EVANSTON, 300 tons, building for Illinois Bell Telephone Co., to Concrete Steel Co.; previously reported to an unnamed bidder.
 CHICAGO, 100 tons, warehouse, to Concrete Engineering Co.
 CHICAGO, 100 tons, apartment building at 1624 Sherman Avenue, to Calumet Steel Co.
 CHICAGO, 100 tons, institute for juvenile research, to Concrete Engineering Co.
 SEATTLE, 500 tons, Mount Diablo dam, to Northwest Steel Rolling Mills.
 SANTA ANA, CAL., 141 tons, paving project, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 250 tons, North Station unit.
 BOSTON, 100 tons, Lying-in Hospital unit.
 JAMAICA, N. Y., 490 tons, Long Island Railroad improvements; general contractor, Foley Brothers, Inc., 117 Liberty Street, New York.
 CLEVELAND, 100 tons, building for Norton Co.
 COOK COUNTY, ILL., tonnage not stated, highway bridge work.
 CHICAGO, 160 tons, factory building at Belmont Avenue and Tripp Street.
 CHICAGO, 240 tons, garage at 3111 Broadway.
 CHICAGO, 950 tons, apartment building at Fifty-fourth Street and Hyde Park Boulevard.
 SAN FRANCISCO, 300 tons, foundations for Opera House and Legion buildings; bids June 18.
 SACRAMENTO, CAL., 256 tons, bridge over Sallinas River; bids June 26.
 SACRAMENTO, 120 tons, two bridges in Sacramento County; bids June 26.
 SACRAMENTO, 133 tons, paving in Madera County; bids June 26.
 HAYWARD, CAL., 150 tons, mausoleum; bids being taken.

PERSONAL

EDWARD L. RYERSON, JR., has been elected president of Joseph T. Ryerson & Son, Inc., Chicago, succeeding JOSEPH T. RYERSON, who will remain a member of the board and will continue to hold the office of treasurer. The new president has had 20 years of experience in the operating and marketing divisions of the business. He was graduated from the Sheffield Scientific School of Yale University in 1908 and later attended the Massachusetts Institute of Technology. Coming to the Ryerson company in 1909, he entered the operating depart-



E. L. RYERSON

ment and subsequently became works manager. Early in the war he entered service with the Aircraft Production Board at Washington and was later captain in the Air Service Division of the Signal Corps. In 1922 he was elected vice-president of the Ryerson company and in 1928 became vice-president and general manager. He is a member of the board of trustees of the University of Chicago and a director of the Northern Trust Co., Chicago, and the Quaker Oats Co., Chicago. The Ryerson company, now in its eighty-seventh year, is the leading steel warehousing organization in the country, with plants at Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Cleveland and Jersey City.

M. G. JEWETT, Chain Belt Co., has been elected president of the Milwaukee chapter, American Society for Steel Treating. F. A. HANSEN, of the Hevi-Duty Electric Co., is the new vice-president. The chapter has a membership of 175.

G. L. TAYLOR, chief engineer, McClintic-Marshall Co., Pittsburgh, has retired from that position and will locate in southern California, where he may engage in private consulting engineering practice. He is a graduate of the University of Pennsylvania,

and became identified with the McClintic-Marshall company at its inception soon after he left college. He has remained with the company in his recent capacity since that time. JONATHAN JONES, assistant chief engineer, who was recently in charge of the construction of the Detroit-Windsor bridge, has succeeded Mr. Taylor as chief engineer. Mr. Jones has been succeeded in turn by ROBERT MACMINN, who has been engineer of construction at Detroit for the company.

W. W. PHILLIPS has been appointed district sales manager of the metropolitan New York and Eastern States district, with office at 87 Poinier Street, Newark, N. J., for the Columbia Tool Steel Co., Chicago Heights, Ill.

W. G. HUME, formerly general sales manager of the Keystone Steel & Wire Co., Peoria, Ill., has been elected vice-president of the Northwestern Barb Wire Co., Sterling, Ill.

J. B. WOODWARD has been appointed assistant general manager of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. CARL E. PETERSEN has been appointed assistant to the vice-president in the New York office.

JOHN L. CONNORS, for the past nine years president of the Morgan-Gardner Electric Co., Chicago, has become assistant general manager of the Jeffrey Mfg. Co., Columbus, Ohio.

J. F. DONAHUE, former vice-president and general manager of the Foster Bolt & Nut Mfg. Co., Cleveland, was elected president of the company, succeeding A. M. FOSTER, who has become chairman of the board of directors.

EDWARD M. FREELAND, chief metallurgist, Follansbee Brothers Co., Follansbee, W. Va., has resigned, and on July 1 will become associated with the Allegheny Steel Co., Brackenridge, Pa. He has been identified with the Follansbee company since 1921, and previously was with the Bethlehem Steel Co.

CHARLES F. ABBOTT, executive director, and LEE H. MILLER, chief engineer, of the American Institute of Steel Construction, addressed a dinner meeting on June 3 of over 200 Chicago engineers and architects.

H. G. DALTON, Pickands, Mather & Co., Cleveland, has been elected president of the Interlake Steamship Co., succeeding the late Harry Coulby. Mr. Dalton was president of the Interlake company for several years after its organization in 1907.

GEORGE L. MEADE, vice-president, Pratt & Whitney Aircraft Co., Hartford, Conn., is in Europe on a tour of inspection of airplane and engine plants.

ROGER D. PROSSER, of Thomas Prosser & Son, who recently returned from Germany, was the guest of the Boston chapter of the American Society for Steel Treating at a meeting, June 7, at the Massachusetts Institute of Technology. Mr. Prosser's address was on the development and practical application of Widia tools in the machine shop.

GEORGE R. HANKS, whose election to the presidency of the Taylor-Wharton Iron & Steel Co., High



G. R. HANKS

Bridge, N. J., was mentioned last week, has been connected with the company since his graduation from Princeton University in 1915.

C. A. ANDERSON has been appointed sales manager of the Ford Chain Block Co., Philadelphia.

R. L. HALLETT, of the research laboratories, National Lead Co., Brooklyn, N. Y., sailed for Europe on June 12 on a business trip lasting to the end of the summer.

S. S. PORTER, vice-president, Calumet Steel Co., Chicago, will sail June 19 with his family for a two months' motor trip through England.

JAMES N. HEALD and S. T. MASSEY of the Heald Machine Co., Worcester, Mass., returned last week from a European trip of about five weeks.

H. L. BURKHART, for 10 years assistant traffic manager for Hyman Michaels Co., Chicago, has been appointed traffic manager succeeding the late A. L. Dreher. Mr. Burkhardt was formerly in the traffic department of the Lehigh Portland Cement Co., and prior to that he was with the Chicago, Rock Island & Pacific, Chicago, Great Western, Belt Railroad of Chicago, and the Michigan Central.

Further Protests Against Southern Rates

Commerce Commission Hears Both Sides on Proposed Reduction from Alabama Furnaces

WASHINGTON, June 11.—Reduced rates on pig iron from Southern furnaces to points north and to Gulf and Atlantic ports will become effective on Thursday of the present week unless they are suspended tomorrow by the Interstate Commerce Commission, which as yet has not acted upon them.

The most vigorous protests have been made against the proposed reductions to St. Louis and intermediate points and have come from railroads serving the Northern furnaces, as well as steel and pig iron producers, and the Louisville, Ky., Board of Trade. At the same time pig iron consumers have asked that the proposed reduction in the rate to St. Louis from Birmingham be permitted to go into effect. Among melters making this request are the Oakland Foundry Co. and the Eagle Foundry Co., Belleville, Ill., and the Tower Grove Foundry Co., the Mound City Foundry Co. and the Medart Co., St. Louis. The tariff proposing cuts to Northern points would reduce the Birmingham-St. Louis rate to \$3.69 from \$4.42 per gross ton. The protests of the Mobile, Ala., Chamber of Commerce and the Alabama State Docks Commission were withdrawn late last week, when the carriers agreed not to narrow the spread in rates between Mobile and other ports. The railroads removed the Mobile protest by proposing a rate of \$2.25 from Birmingham instead of the originally proposed rate of \$2.45.

The protests against the tariffs reducing rates to Northern points reached such proportions that the investigation and suspension board of the commission called a conference of the conflicting interests, which was held last Thursday. At this meeting Central Freight Association, Illinois Freight Association and Western Trunk Line carriers pointed out that if the \$3.69 rate were put into effect Northern producers would insist upon a like reduction from their furnaces. In addition to protestants previously named against the proposed reduction, the Inland Steel Co., Chicago, and the Andrews Steel Co., Newport, Ky., have filed objections. It is contended that unless points north are granted similar reductions the pig iron rate relationship will be disturbed and discrimination against Northern interests result. The petition of the Andrews company said it is opposed to the "proposed discriminatory reduction to St. Louis unless and until such reduction is made in the rate to Cincinnati as will preserve the long-existing relationship between these points."

Speaking at the conference for the Southern Freight Association, J. E. Tilford said that the Southern lines did not contend that \$3.69 would be a reasonable maximum rate, but he emphasized the comparison of this rate, as applying to a distance of 474 miles from Birmingham to St. Louis, with

the rate of \$2.16 for the 280-mile haul from Chicago to St. Louis. He also pointed to the rate of \$3.15 from Chicago to Cincinnati, showing a difference of 99c. per ton a haul to Cincinnati one mile longer than the haul to St. Louis on a \$2.16 rate. He said the proposed reductions from the Southern furnaces were due to competition, together with overproduction of pig iron in the Southern district. The proposed changes were also supported by W. B. Lewis, appearing for shippers in the Southern furnace territory. C. W. Galligan of the Illinois Freight Association, in defending the \$2.16 Chicago-St. Louis rate, said that one reason for its establishment was the large southbound empty movement of coal cars to southern Illinois territory. He said that although the Illinois Central Railroad is a party to the proposed \$3.69 Birmingham-St. Louis rate, it is opposed to it. W. E. Rosenbaum, St. Louis Gas & Coke Corporation, said that the proposal of the Southern lines would break up the relationship in rates which the commission in numerous decisions had endeavored to retain.

Medium-Manganese Steel for Largest Arch

(Concluded from page 1643)

in the alloy is less than the nickel in the nickel steel; (c) high-manganese scrap, either crop ends or off heats, may be remelted and converted into commercial grades of tonnage steel without necessity of segregation and conversion into special analysis alloy steel; (d) no special precautions in the rolling mill are necessary, whereas nickel steel is difficult to roll without minor surface imperfections; (e) medium-manganese steel is softer than $3\frac{1}{4}$ per cent nickel steel, and can be sheared, milled, drilled and flanged more readily during fabrication.

Not satisfied with the available experimental results, the Port Authority asked the American Bridge Co. to undertake additional and unusually elaborate tests of the steel in the early stages of its manufacture, to give more complete information on the quality and behavior of the steel than would be possible with customary routine testing.

To date, 35 heats, representing approximately 1000 tons of manganese steel, have been rolled into structural plates and shapes and all of them have been accepted by the Port Authority as meeting the requirements. Only three other heats made were not offered to the Port Authority and in fact were not rolled into plates or shapes. The results so far obtained are entirely reassuring that the material is of an excellent and uniform quality and indicate the feasibility of manufacturing this manganese steel

commercially for structural purposes. All the physical tests are well above the limits set for acceptance.

Additional information will be secured during fabrication, for many of the operations will discover material which is non-uniform or lacking in ductility. It is a common saying among structural engineers that a fabricated member is given more severe treatment in the shop than it gets during erection or subsequent use.

Some criticism has reached the Port Authority of this action in accepting a new alloy steel for an important structure, especially in view of the unhappy experience with a new variety of bridge wire used at Mount Hope, R. I., and Detroit. In justification it may be said that medium-manganese steel is not a new alloy, nor in fact a new structural steel. Since the disarmament conference the British Admiralty has used it (in a form known as "D-quality") for the main members of all the warship hulls; and it has given entire satisfaction. In this country, the medium-manganese rail (carbon 0.55 to 0.70 per cent) has gained rapid favor. Similar analyses, slightly lower in carbon and manganese than the rail, have also been used for hundreds of thousands of compressed gas cylinders. (See THE IRON AGE, June 28, 1928, page 1813; March 21, 1929, page 797; and April 4, 1929, page 940.)

Obituary

JOSEPH J. WILSON, for many years general superintendent of foundries of the General Motors Co., died at his home in Akron, N. Y., May 25, aged 73 years. He started his foundry career as a molders' apprentice when he was 14 years old. In 1882 he became assistant foreman in the plant of the Farrel Foundry & Machine Co., Ansonia, Conn., serving in that capacity for 12 years. He entered the automotive field in 1902 and continued his connection with that industry until his retirement in 1924. He was a past-president of the Detroit Foundrymen's Association, and served as vice-president of the American Foundrymen's Association in 1910 and from 1913 to 1915.

D. T. HOMAN, vice-president, Bridgeport Safety Emery Wheel Co., Bridgeport, Conn., died on April 6, aged 83 years. He was active in the sale of the company's machinery until a few years ago.

WILLIAM HAMILTON KIDSTON, chairman of the board, A. G. Kidston & Co., steel merchants, Glasgow and London, died June 4, aged 77 years.

ALFRED BURCH, chairman of the board, Bradley & Burch, Ltd., London, tin plate, steel, non-ferrous metal merchants and tin plate machinery agents, died June 7, aged 69 years.

Machinery Markets and News of the Works

Recession Is Gradual

Machine Tool Orders Still at High Level Despite Decline in Automobile Buying

ALTHOUGH buying by automobile companies has dropped off considerably, the volume of machine tool buying is at a fairly high level. The diversification of demand is the outstanding feature. The recession over the past two months has been very gradual. The outlook for June is good.

An inquiry for 46 tools from the Curtiss-Caproni Corporation, which will build a new plant at Baltimore, is the largest item of prospective business, but inquiries for small lots of tools are numerous.

The Delaware, Lackawanna & Western Railroad has placed orders

totaling about \$75,000, which is less than half the list that the road recently inquired for. Other railroad buying has been in smaller lots. The Burlington has ordered several tools at Chicago, and the Union Pacific has closed for the remainder of the items on its recent list. The Santa Fe still has some purchases to make.

The International Harvester Co. is expanding its plant at Moline, Ill. Other farm implement manufacturers have plans for increasing their facilities. There is a seasonal downward trend in buying of farm machinery, but it is expected that summer activities will be much above normal.

New York

NEW YORK, June 11.—Machine tool business has been fairly good the past week, and prospects of a steady volume of buying through June are increasingly promising. Inquiries have increased. The Curtiss-Caproni Corporation, 10 East Forty-fourth Street, New York, which will build a new plant at Baltimore to manufacture flying boats, has inquired for 46 tools. The Delaware, Lackawanna & Western Railroad placed orders for about \$75,000 worth of shop equipment, which was less than half the quantity it recently inquired for. Mack Trucks, Inc., has been buying additional tools for its plant at New Brunswick, N. J.

Curtiss-Caproni Corporation, mentioned above, has purchased a site at Baltimore airport for a manufacturing plant on which work will be begun soon. Company is affiliated with Curtiss Aeroplane & Motor Co. Its president is Frank H. Russell, who is vice-president of Curtiss company. Capt. G. C. Westervelt is vice-president and general manager and will have charge of manufacturing. Company has issued following inquiry for machine tools: Nineteen engine lathes, from 10 in. to 24 in., three tool room lathes, six turret lathes, four automatic screw machines, 14 milling machines of various types.

Curtiss Airports Corporation, affiliated with Curtiss Flying Service, Inc., 27-29

West Fifty-seventh Street, New York, both identified with Curtiss Aeroplane & Motor Corporation, Buffalo, has acquired 250-acre tract adjoining Pelham Bay Park, on Hutchinson River, as site for new airport, to include hangars, repair and reconditioning shops, parts and assembling buildings, oil storage and other field structures, to cost over \$2,000,000 with equipment. A subsidiary will be formed under name of Curtiss Bronx Field, Inc., to carry out project, on which work will soon begin. Company will operate a chain of airports in important cities from coast to coast. Walter S. Marvin is president.

Keller Mechanical Engineering Corporation, 70 Washington Street, Brooklyn, manufacturer of die-cutting machinery, dies, etc., has plans for a one and two-story plant at Belleville, N. J., to cost \$200,000 with equipment. Fletcher-Thompson, Inc., 738 Broad Street, Newark, and Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Traveltone Co., recently organized to take over and expand Heinaphone Co., Long Island City, manufacturer of radio equipment for use on automobiles, has leased building on Queens Boulevard, 175 x 200 ft., for new plant and service department, and will concentrate production largely at that location.

American Can Co., 120 Broadway, New York, is said to be planning a multi-story factory branch, storage and distributing plant at Seattle, with shipping dock, to cost over \$700,000 with equipment.

Fowler Aeroplane Wings, Inc., Highland Park, N. J., has been incorporated with capital stock of \$100,000 to manufacture products for aeronautical industry. Company has plant in operation.

Harry M. Sushan, 367 Fulton Street, Brooklyn, architect, has plans for two-story automobile service, repair and garage building, to cost about \$100,000 with equipment.

Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, has approved plans for seaplane base at Amityville, L. I., including hangar, repair and reconditioning shop and other structures, to cost about \$100,000 with equipment. Lockwood Greene Engineers, Inc., 1 Pershing Square, is architect and engineer.

S. Steinmetz, 61 School Street, Yonkers, N. Y., has plans for three-story cold storage and refrigerating plant, to cost more than \$140,000 with equipment. J. Watson, City Hall, is architect.

Truscon Steel Co., 31 Union Square, New York, with main plant at Youngstown, Ohio, is said to have plans for a one-story factory branch, storage and distributing plant at Harrison, N. J., to cost more than \$150,000.

United States Metals Refining Co., Carteret, N. J., has acquired part of local plant of Chrome Steel Works, recently reorganized as Chrome Steel Corporation, and will use for early future expansion. Chrome company is said to be arranging early purchase of site for new mill to manufacture metal balls, concrete reinforcing bars and kindred products.

Board of Education, Cranford, N. J., is said to be planning installation of manual training equipment in new high school to cost about \$225,000, for which plans will be drawn by H. B. Brady, Inc., 333 North Broad Street, Elizabeth, N. J., architect.

Kroydon Co., Maplewood, South Orange, N. J., manufacturer of golf sticks, irons, etc., is said to be arranging call for bids on general contract for one-story and basement addition, 32 x 150 ft., to cost about \$50,000 with equipment. D. A. Hooper, 22 Ridgewood Avenue, Irvington, N. J., is architect.

R. G. Smith Tool & Mfg. Co., 245 New Jersey Railroad Avenue, Newark, manufacturer of tools and special machinery, has purchased property at 245-51 South Street, totalling about 15,000 sq. ft. floor space, and will remodel for new plant.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, Robert O. Beebe, director, will receive bids until June 25 for steel lockers and counters, also for equipment for different trades departments, as per specifications on file.

Perth Amboy Coal & Ice Co., 558 State Street, Perth Amboy, N. J., will soon begin superstructure for one-story ice-manufacturing plant, 100 x 200 ft., to cost about \$100,000 with machinery. Benjamin Goldberger, 117 Smith Street, is architect.

Philadelphia

PHILADELPHIA, June 10.—Contract has been let by Reyburn Mfg. Co., Thirty-second Street and Allegheny Avenue, Philadelphia, manufacturer of tickets, tags and other cardboard products, to J. S. Rogers Co., Drexel Building, for five-story addition to cost about \$375,000 with machinery. LeRoy B. Rothschild, 215 South Broad Street, is architect.

Philip S. Tyre, 114 South Fifteenth Street, Philadelphia, architect, has plans for four-story automobile service, repair and sales building for Packard, Inc., 3221 North Broad Street, representative for Packard automobile, to cost about \$300,000 with equipment.

Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia, manufacturer of pyrometers and other electrical measuring instruments, has awarded a general contract to William R. Dougherty, 1610 Sansom Street, for extensions and improvements in plant to cost about \$35,000. Morris & Erskine, 1716 Cherry Street, are architects.

Excel Auto Radiator Works, 1827 South Michigan Boulevard, Chicago, has leased 14,000 sq. ft. floor space at Water and Jackson Streets, Philadelphia, for factory branch and service works.

Robert Glendinning, Jr., 8431 Prospect Avenue, Philadelphia, and associates have organized Aircraft Engine Corporation, and plans operation of local factory for production of aircraft motors and parts. Albert R. Jacobs, 106 Ryers Avenue, Cheltenham, is also interested in new organization.

David Lupton Sons Co., Sixteenth and Walnut Streets, Philadelphia, manufacturer of steel sash, etc., has leased part of building at 325 Borden Avenue, Long Island City, for new factory branch and distributing plant.

Board of Education, Swedeland, Pa., is considering installation of manual training equipment in new two-story junior high school in Edgewood district to cost \$200,000, for which plans will be drawn by Ritter & Shay, Fifteenth and Chestnut Streets, Philadelphia, architects.

Pitcairn Aircraft, Inc., Bryn Athyn, Philadelphia, affiliated with Pitcairn Aviation Inc., Land Title Building, has awarded general contract to Barclay White & Co., 22 North Thirty-sixth Street, for new one-story aircraft plant at Halliwell, Pa., 150 x 375 ft., to cost about \$100,000 with equipment, to include departments for parts production and assembling.

Sunbury Industrial Buildings, Inc., 342 Market Street, Sunbury, Pa., has plans for a three-story factory unit to cost about \$100,000. W. D. Schollenberger, 11 West Fourth Street, Williamsport, Pa., is architect.

Prospect Park School Board, Prospect Park, Pa., has authorized erection of one-story manual arts school to cost about \$75,000 with equipment, superstructure to begin at once. C. W. Brazer, Crozer Building, Chester, Pa., is architect.

Frank B. Hanna, director of public works, City Hall, Camden, N. J., will soon ask bids for incinerating plant at Cooper River and Federal Street, three stories, 55 x 70 ft., with power department, conveying equipment, unloading machinery and auxiliary mechanical equipment to cost \$200,000.

Concentric Air-Cells Automatic, Inc., has been organized to manufacture automatic machines for making Air-Cells pipe

The Crane Market

OVERHEAD crane users are actively inquiring for equipment, but are inclined in some instances to delay buying, influenced by the belief that the recent increase of 5 to 15 per cent in the prices of motors and other electrical equipment may not be maintained. Inquiry for locomotive cranes is active and some substantial orders have been placed. The New York Central Railroad has not yet closed on two 25-ton locomotive cranes.

The Chesapeake & Ohio Railroad, which recently placed twenty-four 2½-ton cranes with the Hoist & Crane Engineering Co., New York, four 5-ton overhead cranes with the Shepard-Niles Electric Crane & Hoist Corporation, two 5-ton hand-power cranes with the Chisholm & Moore Mfg. Co. and 36 small jib cranes with an unnamed builder, has awarded twenty-two 1-ton electric hoists to the American Engineering Co., Philadelphia.

Among current inquiries the Central Power & Light Co., Devels River, Tex., is inquiring for a 65-ton, overhead electric crane. In the Pittsburgh district the Carnegie Steel Co. is expected to close soon on two soaking pit cranes for Farrell, Pa. The National Tube Co. is inquiring for two cranes for McKeesport, Pa., the Gulf States Steel Co., Birmingham, is in the market for cranes for its Alabama City plant, and the Great Lakes Steel Corporation, Detroit, has issued an inquiry for 20 to 30 overhead cranes ranging from 5 tons to 250 tons for its new steel plant.

Among recent purchases are:

Illinois Steel Co., Gary, Ind., one 40-ton, one 15-ton, one 30-ton and two 10-ton electric overhead cranes and eight 10-ton and one 7½-ton double trolley cranes from Alliance Machine Co.

Anaconda Copper Mining Co., New York, 5-ton, 15-ft. 1¾-in. span, 2-motor overhead crane for Anaconda, Mont., from unnamed builder.

Amorg Trading Corporation, New York, large pig-casting ladle crane for export to Russia from Alliance Machine Co.

Harbor Commission, Milwaukee, 30-ton, 8-wheel, gasoline driven locomotive crane from Orton Crane & Shovel Co.

covering. Machines are being manufactured on contract by Hess & Barker, Inc., 212 South Darien Street, Philadelphia, and office and factory of Concentric Air-Cells Automatic, Inc., are at same address. A. P. Jurgensen is president of latter company.

Buffalo

BUFFALO, June 10.—A company is being organized by G. Maclean Gardner, 244 Roycroft Boulevard, Buffalo, formerly vice-president in charge of manufacture of General Airplanes Corporation, with local factory, to manufacture aircraft of original design. It is planned to construct and operate a plant in Buffalo district, including both parts production and assembling departments. Mr. Gardner will head new organization.

Pfaudler Co., 89 East Avenue, Rochester, N. Y., manufacturer of enameled steel kettles, tanks, dairy equipment, etc., will take bids for two-story addition to cost

about \$50,000 with equipment. Gordon & Kaelber, 311 Alexander Street, are architects.

Quisenberry Feed Mfg. Co., 95 Kentucky Avenue, Buffalo, has plans for a new grain elevator, to cost over \$150,000, with elevating, conveying and screening equipment.

F. William Fladd, 47 Laurelton Road, Rochester, N. Y., and associates have organized Fladd-Luig Co., with capital of \$50,000, and plans operation of local factory to manufacture heating equipment. Edward Luig, 439 Lake Avenue, will be an official of new company.

Skenandoa Rayon Corporation, 1201 Broad Street, Utica, N. Y., is said to be planning early call for bids for additions to mill, including power plant, latter unit to cost more than \$350,000 with machinery. Entire project will represent investment of about \$3,000,000. W. E. S. Dyer, Land Title Building, Philadelphia, is architect and engineer.

General Motors Corporation, Detroit, is reported to have purchased large tract at Tonawanda, N. Y., as site for a new assembling plant for one of its divisions, to cost over \$500,000 with equipment.

Star Ring Mfg. Co., 723 Main Street, Buffalo, jewelry manufacturer, has acquired building at 887-89 Main Street, and will remodel for new factory.

New England

BOSTON, June 10.—Sales of new tools reported the past week were scattered and included a large radial drill to a Massachusetts machinery builder and a fairly representative lot of lathes in single units to a diversified list of manufacturers. Dealers report few new inquiries. Business in used tools is fair; recent sales include a 16-in. gap lathe, a Hendee universal milling machine, a Bilton miller and miscellaneous small tools. Small tool business continues active.

New England Water, Light & Power Co., 833 Hospital Trust Building, Providence, R. I., contemplates a hydroelectric development at East Hampton, Conn. Arthur Lisle is in charge of project.

New Britain Tool Mfg. Co., 10 Harvard Street, New Britain, Conn., is erecting a one and one-half story plant, 50 x 98 ft., to cost \$18,000 without equipment.

Moore Drop Forging Co., 38 Walter Street, Springfield, Mass., will close bids June 13 on a one-story unit, 75 x 170 ft., for which forging equipment will be required.

Hatheway Mfg. Co., Bostwick and Railroad Avenues, Bridgeport, Conn., metal specialties, is building a one-story addition, 50 x 121 ft.

Aircraft Corporation of America, Inc., Milford, Conn., has begun erection of new plant to manufacture hydroplanes, including parts production and assembling, to cost over \$50,000 with equipment.

O. K. Tool Co., Inc., 33 Hull Avenue, Shelton, Conn., is said to be planning one-story addition to cost about \$25,000 with equipment.

Battery Containers, Inc., Lowell, Mass., recently organized, has taken over part of local plant of United States Cartridge Co. to manufacture automobile and radio battery equipment, parts, boxes, etc. R. M. Taylor is president and treasurer; John A. Lindenberg, vice-president, is in charge of production.

Boston & Albany Railroad Co., South Station, Boston, has taken bids on general contract for engine house, with repair facilities, at Beacon Park yards, to cost about \$100,000 with equipment.

Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, has filed plans for a new flying field and airport at Boston, including hangars, repair and reconditioning shops, and other units, to cost \$100,000 with equipment.

Cities Service Refining Co., East Braintree, Mass., is planning to rebuild part of local oil refinery destroyed by fire June 5. New England headquarters are at 260 Tremont Street, Boston.

Otis Elevator Co., 130 Clarendon Street, Boston, headquarters at Eleventh Avenue and Twenty-sixth Street, New York, has awarded general contract to D. H. Jacobs & Son, Inc., 77 Summer Street, for three-story addition, 85 x 100 ft., to cost over \$100,000 with equipment.

Apex Tool Co., 50 Remer Street, Bridgeport, Conn., has been organized with capital stock of \$50,000 to manufacture tool holders and tool bits. Officers are: S. B. Swanson, president and treasurer; S. Swanson, vice-president; D. J. Swanson, secretary.

Pittsburgh

PITTSBURGH, June 10.—Business so far in June is considerably ahead of that in May and, in view of the heavy inquiry, the present month is likely to be one of the best since the war. Local dealers are working, or have figured, on equipment for nearly all of the large plants in this district and are now beginning to take orders against the expansion and replacement programs announced early in the year. The Bethlehem Steel Co. has placed several turret lathes for its Johnstown plant and will buy a number of other tools before the end of the summer. The A. M. Byers Co. is beginning to issue specifications on equipment for its new plant at Ambridge, Pa., and the principal subsidiaries of the Steel Corporation in this district are in the market for good sized lists of tools.

The activity of the large steel plants comes at a convenient time, as there is a temporary lull in railroad buying and the Westinghouse Electric & Mfg. Co. has closed against the greater part of its second quarter list. The present quarter will likely be the best Pittsburgh dealers have had in a number of years in cranes as well as machine tools and miscellaneous machinery.

Contract has been let by Ruud Mfg. Co., Twenty-ninth and Smallman Streets, Pittsburgh, manufacturer of automatic gas water heaters, to Austin Co., for two-story and basement addition, to cost \$45,000 with equipment.

Board of Education, Mapletown, Pa., will soon take bids on general contract for a three-story vocational school, to cost about \$50,000 with equipment. H. W. Altman, Fayette Title and Trust Building, Uniontown, Pa., is architect.

Strayer Coin Bag Mfg. Co., 507 Fourteenth Street, New Brighton, Pa., has awarded general contract to O. R. McNutt, Eleventh Street, for one-story addition, to cost over \$30,000 with equipment.

Extruded Metal Products Co., 109 South Lincoln Avenue, Wheeling, W. Va., has begun work on one-story foundry, to cost about \$25,000 with equipment. Joseph Millard is president.

Keystone Water Works & Electric Corporation, Ellwood City, Pa., operating electric light and power properties, waterworks and other utilities in western Pennsylvania, West Virginia and other localities, has arranged for a bond issue of \$2,200,000, part of proceeds to be used for extensions and improvements in plants and systems.

Pittsburgh Equitable Meter Co., 400 Lexington Avenue, Pittsburgh, manufacturer of gas meters, parts, etc., has awarded general contract to Austin Co. for one-story addition, to cost about \$55,000 with equipment.

Chicago

CHICAGO, June 10.—Both sales and fresh inquiries continue to taper, but the change is gradual. New orders are not only less numerous but are coming from a narrowing circle of buyers. Jobbing shops in and near Chicago are less active and with the exception of one industrial list for 14 items there is little of immediate importance before the trade.

International Harvester Co. is expanding its Moline, Ill., plant. Other farm implement manufacturers have similar plans and this situation leads the trade to believe that summer business will be in good volume notwithstanding the downward trend in orders from present buyers. The Burlington has ordered several machine tools and the Union Pacific has closed all items against its list. The Santa Fe still has purchases to make and the St. Paul will buy a motor-driven, heavy-duty turret lathe. Louisville & Nashville is said to be in the market for several machine tools. Board of Education, Chicago, will buy four motor-in-head lathes.

Three of five buildings of Iowa Sheet Metal Products Co., Muscatine, Iowa, were destroyed by fire May 22. Rebuilding will be started at once.

Standard Stamping Co., 3131 Forty-ninth Place, Chicago, will build a one-story factory, 90 x 143 ft., to cost \$20,000. Mundie & Jensen, 87 South La Salle Street, are architects.

Evans Brothers, 4214 Taylor Street, Chicago, will build a one-story machine shop, 50 x 60 ft.

Pyle National Co., 1338 North Kostner Street, Chicago, manufacturer of electric head lights, will build a two-story addition, 91 x 110 ft., to cost \$48,000. E. R. Nielsen, 3059 Augusta Avenue, is architect.

Magnavox Co., Oakland, Cal., has acquired space for a branch plant in unit E of the Central Storage Corporation's Building, 3931 South Winchester Avenue, Chicago.

Norendale Mfg. Co. at 1638 North Paulina Street, has purchased property at corner of Hoyne Avenue and Fulton Street, 38 x 125 ft., for erection of a two-story factory unit to cost \$50,000.

Gustafson & Sons, Chief River Falls, Minn., have started excavation for a new machine shop, 25 x 70 ft.

General Fountain & Fixture Co., Chicago, manufacturer of soda fountain equipment, store fixtures, etc., has leased space in building at 921-37 West Nineteenth Street, totaling about 60,000 sq. ft. floor space, for new plant.

Stewart-Warner Speedometer Corporation, 1828 Diversey Parkway, Chicago, has purchased Lassig plant of American Bridge Co., on neighboring site, for expansion. Present buildings will be utilized at this time, it is understood, and other structures built later. Part of

acquired property will be given over to production of automobile brakes and kindred specialties.

Montana-Dakota Power Co., Minneapolis, Minn., is said to be planning new steam-operated electric power plants at Circle and Richey, Mont., each to cost over \$80,000 with equipment. It is purposed to use oil-operated engine units.

Minneapolis Electric Steel Casting Co., 3800 N. E. Fifth Street, Minneapolis, Minn., has work under way on one-story addition, 80 x 100 ft., to cost about \$40,000.

Williams Oil-O-Matic Heating Corporation, 187 North Michigan Avenue, Chicago, is said to be considering manufacture of aircraft engines as branch line of output, and will develop facilities at main plant at Bloomington, Ill., for expansion.

Wollery Machine Co., Como and Twenty-ninth Avenues, S. E., Minneapolis, Minn., has plans for one-story addition, 50 x 170 ft., to cost about \$40,000 with equipment. Anton Jensen, Essex Building, is architect.

Heckman Tool & Mfg. Co., 4018 West Lake Street, Chicago, manufacturer of special tools, dies and hardware, has recently completed an addition to its plant.

Heinze Petzelt Machine Co., 711 West Lake Street, Chicago, manufacturer of special tools and parts used in sound talking machines, is now manufacturing parts for airplanes. M. P. Heinze is president.

Quality Hardware & Machine Co., Inc., 5849 Ravenswood Avenue, Chicago, dies, tools, etc., has recently incorporated for \$500,000. Company's new plant, 75 x 160 ft., will triple former output.

Appleton Electric Co., Chicago, manufacturer of electrical conduit fittings, has purchased Gem Powerlet line of conduit fittings from Jefferson Electric Co., formerly Chicago-Jefferson Fuse & Electric Co. A. I. Appleton is president and treasurer of Appleton company.

South Atlantic

BALTIMORE, June 10.—Mill and property of Antietam Paper Co., Hagerstown, Md., has been secured by new interests headed by L. A. Bupp, York, Pa. Company will be reorganized and plans are under way for extensions and improvements in plant, to cost about \$50,000 with equipment.

Public Improvement Commission, City Hall, Baltimore, is considering installation of manual training equipment in three-story junior high school for negro students to cost \$425,000. Taylor & Flasher, Union Trust Building, are architects.

United Cold Storage Co., Inc., 2101 West Pershing Boulevard, Chicago, M. D. Poronto, president, is said to have plans for multi-story cold storage and refrigerating plant at Atlanta, Ga., to cost over \$1,000,000 with equipment.

Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, has begun work on new flying field and airport at Raleigh, N. C., where 300-acre tract was recently acquired, to include hangar, 100 x 120 ft., repair and reconditioning shop, and other field structures, to cost over \$100,000 with equipment.

American Oil Co., American Building, Baltimore, is planning construction of new oil storage and distributing plant at Atlantic City, N. J., to cost about \$80,000 with equipment. Company is also considering extensions and improvements

in similar plant at Wilmington, Del., and is negotiating with city for vacating of desired land. T. O'Connell is company engineer.

Nu-Grape Bottling Co., Macon, Ga., recently organized by Ralph V. Grayson, Macon, and associates, has engaged Cecil C. Hays, 305 Church Street, architect, to prepare plans for new bottling plant, including automatic bottling, capping, conveying and other equipment, to cost about \$40,000.

Howard Baldwin, 339 St. Paul Street, Baltimore, architect, has plans for three-story automobile service, repair and garage building, 100 x 185 ft., to cost about \$160,000 with equipment. Kubitz & Koenig, Emerson Tower Building, are consulting engineers.

Thomas W. Shelton, Bank of Commerce Building, Norfolk, Va., is at head of project to construct and operate a local airport and flying field on 200-acre tract near Waterworks Road, consisting of hangars, machine repair and reconditioning shops, oil storage and other field units, to cost more than \$300,000. A company will be organized.

Atlanta Gas Light Co., Atlanta, Ga., has plans for an equipment storage and distributing plant, including repair facilities, totaling about 40,000 sq. ft. floor space, to cost \$100,000 with equipment. Company is operated by Southern Cities Public Service Co., a subsidiary of Central Public Service Corporation, 105 West Adams Street, Chicago.

Virginia Electric & Power Co., Richmond, Va., is reported to be arranging for hydroelectric generating plant on Roanoke River, near Roanoke Rapids, N. C., to cost about \$5,000,000 with transmission system.

Mallory Machinery Corporation, 522 Light Street, Baltimore, is in market for a used shear with capacity to cut not less than 3 or 4 in. round mild steel, with not over 15 to 18-in. throat.

Cleveland

CLEVELAND, June 10.—The volume of machine tool business which tapered off in the latter part of May showed a further slight decline the past week. However, sales are still fair, but are confined to single machines. Orders for turret lathes are holding close to recent volume but inquiry is lighter. Little machine tool business is coming from the automotive industry at present and the market in the Detroit territory is dull. The delivery situation is slightly easier on some lines of tools in the smaller sizes, but no improvement is noted on larger tools.

Contract has been let by Youngstown Steel Door Co., Cleveland, to Heller-Murray Co., 222 West Rayen Street, Youngstown, Ohio, for first unit of new plant at Youngstown, to cost about \$300,000. Present works will be removed to new location.

Elyria Belting & Machine Co., Williams and Buckeye Streets, Elyria, Ohio, will take bids for one-story addition to cost about \$25,000 with equipment. Corwin & Waite, Masonic Temple Building, are architects.

Fidelity Tire & Rubber Co., Warren, Ohio, has acquired manufacturing division of American Tire & Rubber Corporation, Akron, and will continue production of specialties of that organization.

It is proposed to expand operations, particularly at Warren.

White Motor Co., St. Clair Avenue and East Seventieth Street, Cleveland, has plans for one-story service, repair and sales building, to cost about \$200,000 with equipment. Hadlow, Hughes, Hicks & Conrad, 819 Euclid Avenue, are architects.

B. F. Goodrich Co., Akron, Ohio, manufacturer of tires, tubes, mechanical rubber goods, etc., has plans for a three-story addition with foundations to provide for five additional stories, to cost about \$450,000 with machinery.

Superior Screw & Bolt Co., 3650 East Ninety-third Street, Cleveland, has filed plans for one-story addition, 80 x 110 ft., to cost about \$50,000 with machinery.

Board of Education, Shaker Heights, Ohio, is planning installation of manual training equipment in two-story senior high school to cost more than \$1,000,000, for which plans are being prepared by Hubbell & Benes, 4500 Euclid Avenue, Cleveland, architects.

Toledo Screw Co., 621 East Broadway, Toledo, Ohio, has been organized to manufacture screw machine products and is in operation. C. L. Corrello is president and general manager.

Cincinnati

CINCINNATI, June 10.—The first week of June has brought no slowing up in machine tool bookings, which have been sustained at the rate which prevailed during May. Diversification of demand is the outstanding feature of the market, buyers in almost all manufacturing lines having purchased tools this month. In view of the fact that orders from the automobile industry have dropped off considerably in the past few weeks, the high level of sales is notable.

An important lathe builder has observed that bookings of standard engine lathes have been the best in many months. Manufacturers of planers and boring mills are pleased with the trend of business. Production in local shops is being maintained at capacity and orders on hand assure continuance of operations on the current scale during June, July and part of August. Some plants have enough work to carry them into September.

Blue Diamond Coal Co., Dixie Terminal Building, Cincinnati, is arranging for installation of coal-mining plant in High Split Seam section, near Bonny Blue, Va., including coal breaker. Company has acquired plant and equipment of Black Mountain Mining Co., near St. Charles, Va., and will dismantle and remove to location noted. Entire project will cost about \$500,000. Company engineering department is in charge.

Board of Education, North Olmstead, Ohio, is considering installation of manual training equipment in new senior and junior high school to cost \$300,000, for which plans will be drawn by Walker & Norwick, Third and Main Streets, Dayton, Ohio, architects.

Curtiss Flying Service, Inc., Arcade Building, Memphis, Tenn., and 27-29 West Fifty-seventh Street, New York, has approved plans for local airport and flying field, including hangars, repair and reconditioning shops and other units, to cost about \$100,000 with equipment.

J. D. Peacock, 1412 Monroe Avenue, Memphis, Tenn., is at head of project to establish a wood pulp mill in this vicinity. A list of equipment has been

arranged and early purchases are contemplated.

Advance Aircraft Co., Troy, Ohio, manufacturer of Waco airplanes, has changed its name to Waco Aircraft Co. C. J. Brukner is president and general manager.

Gulf States

BIRMINGHAM, June 10.—City Council, Teague, Tex., has authorized construction of municipal electric light and power plant, to cost \$115,000 with machinery. Appropriation has been approved.

Magnolia Gas Products Co., 208 Center Street, Beaumont, Tex., has plans for extensions in industrial oxygen plant, with equipment to double present capacity of 60,000 cu. ft. per day, to cost \$75,000. O. L. Wood is general manager.

Texas Outdoor Advertising Co., 800 Houston Street, San Antonio, Tex., has purchased property and plans erection of one-story factory to manufacture signs, displays, etc., to cost about \$40,000 with equipment.

Roth Brothers Auto Supply & Machine Co., 311 North Flores Street, San Antonio, Tex., has plans by Beretta-Stiles Co., Inc., National Bank of Commerce Building, for three-story addition, to cost about \$100,000 with equipment.

Premier Granite Quarries, Inc., La Grange, Tex., C. R. Stolz, secretary and treasurer, is planning extensions and improvements in properties at Llano, Tex., where 250-acre tract of quarry land has been secured, to cost over \$60,000 with machinery. Company plans installation of cableway, hoisting engines and other equipment.

City Council, Hattiesburg, Miss., is planning establishment of municipal airport, to include hangars, repairs and reconditioning shops and other units, to cost about \$50,000 with equipment. Bonds have been voted.

General American Tank Storage & Terminal Co., New Orleans, a subsidiary of General American Tank Car Corporation, Illinois Merchants' Bank Building, Chicago, has leased adjoining property, including wharf space, for increase in storage and distributing facilities, totaling about 400,000 bbl.

City Council, Fort Worth, Tex., is arranging a fund of \$500,000 for establishment of municipal airport, to include hangars, machine shop and other units. O. E. Carr is city manager, in charge.

Board of Commissioners, East Bank Water District No. 1, Joseph W. Hecker, president, Kenner, La., plans installation of power equipment, pumping and other machinery for extensions and improvements in municipal waterworks, to cost over \$1,000,000. Henry A. Mentz & Co., Inc., Hammond, La., is consulting engineer.

Yellow Cab Co. 424 Dolores Street, San Antonio, Tex., has asked bids on general contract for one-story service, repair and garage building, 140 x 250 ft., with foundations to provide for second story, to cost \$120,000 with equipment. Phelps & Dewees, Gunter Building, are architects; W. E. Simpson, National Bank of Commerce Building, is engineer. W. G. Duncan is president.

City Council, Beaumont, Tex., has acquired 275-acre tract and plans construction of municipal airport, including hangars, repair shops and other field units,

for which a bond issue of \$100,000 has been authorized.

Crescent Machine & Tool Co., New Orleans, recently formed by William J. Ferris, 4233 Banks Street, is said to be planning early operation of local plant for production of tools, special machinery and other equipment. Mr. Ferris will head new organization.

Milwaukee

MILWAUKEE, June 10.—Machine tool builders continue to operate at capacity, and new business being booked probably will require a continuance of the present rate of output throughout the summer. Orders are not quite so numerous or so individually large as earlier in the year, but the aggregate, compared with previous years, is high. The number of men at work in Milwaukee shops broke through 44,000 for the first time the past month, a gain of 276 over the previous month, and an increase of more than 7000 over a year ago.

Mueller Engineering Works, Inc., Racine, Wis., has been organized under Wisconsin laws to continue manufacture of hydraulic jacks and other automotive equipment formerly conducted in South Racine. About 10,000 sq. ft. has been leased in Sattley industrial group and equipment will be substantially increased. Principals in company are J. J. Mueller, Samuel O. Shelstad and J. Allan Simpson, attorney.

Madison-Kipp Corporation, 201 Waukesha Street, Madison, Wis., manufacturer of lubricating devices, is building an addition to cost about \$25,000.

Garton Toy Co., North Water and Niagara Avenue, Sheboygan, Wis., which suffered a heavy fire loss on May 31, has leased a four-story building, 150 x 300 ft., near the damaged plant and will retool at once. New quarters are equipped with generating facilities, elevators, etc. E. B. Garton is president and general manager.

Wisconsin Power & Light Co., Madison, Wis., will remodel its hydroelectric power plant at Fulton, Wis., at cost of \$75,000. E. J. Kallevang is chief engineer.

Great Lakes Malleable Co., 715 Clinton Street, Milwaukee, will start work at once on a one-story shop addition, 30 x 100 ft.

W. E. Lauersdorf, 715 South Pierce Street, Milwaukee, will build a one-story machine shop, 50 x 128 ft.

Detroit

DETROIT, June 10.—About 9-acre tract at Jackson, Mich., has been purchased by Automotive Fan & Bearing Co., Jackson, as site for new plant. Work will soon begin on main one-story unit for machine shop and assembling division for mechanical fans for automobiles and other automotive accessories. It is proposed to remove branch at Detroit to new location and increase production. Later another building is projected. Entire plant is reported to cost about \$150,000 with equipment. Charles Hollerith is secretary and general manager.

Brunswick-Balke-Collender Co., Muskegon, Mich., manufacturer of talking machines, billiard tables, etc., has awarded general contract to O. F. Miller Co., Pratt Building, Kalamazoo, Mich., for two-story addition, to cost about \$50,000

with equipment. Billingham & Cobb, 120 Woodward Avenue, Kalamazoo, are architects and engineers. Headquarters are at 629 South Wabash Avenue, Chicago.

Great Lakes Aircraft Corporation, 16,800 St. Clair Avenue, Cleveland, has purchased former automobile plant of Wills Motor Car Co., Marysville, Mich., comprising 145-acre tract fronting on St. Clair River, with two main units, 360 x 690 ft. and 72 x 370 ft. New owner will improve property for new plant at that location, including both parts and assembling divisions. Purchasing company is a unit of Allied Motor Industries, Inc., Chicago.

Federal Screw Works, Martin Avenue and line of Michigan Central Railroad, Detroit, has awarded general contract to Gallagher-Fleming, Inc., 6500 Edworth Boulevard, for one-story addition at Chelsea, to cost about \$45,000 with equipment. Robert Finn, 415 Brainard Street, is architect. D. S. Diamond is secretary.

Olds Motor Works, Inc., Lansing, Mich., has plans for one-story sheet metal division, 180 x 500 ft. Three crane bays, each 60 ft. wide, will be established for handling materials and equipment. It will cost more than \$500,000 with machinery.

Muskegon Motor Specialties Co., Muskegon, Mich., is planning an expansion program to double present capacity. New units will be built and additional equipment installed to cost over \$50,000. Company was recently consolidated with L. O. Gordon Mfg. Co., with local plant for production of cam shafts and kindred automotive products.

Consumers Power Co., Jackson, Mich., is planning an addition to steam-operated power plant at Grand Rapids, to cost about \$75,000 with equipment.

St. Louis

ST. LOUIS, June 10.—Plans are under way by the American Asphalt Roof Co., Fifteenth Street and Blue River Avenue, Kansas City, Mo., manufacturer of prepared roofing, for one-story addition, 105 x 135 ft., to cost over \$90,000 with equipment. Charles A. Smith, Finance Building, is architect.

Osage Aircraft Co., Pawhuska, Okla., O. G. Corben, manager, is planning establishment of local plant to manufacture light type sport airplanes, including parts and assembling departments, to cost about \$40,000 with equipment.

Watt Plumbing Co., 608 South Cincinnati Street, Tulsa, Okla., O. G. Watt, head, has plans for one-story equipment storage and distributing plant, 140 x 300 ft., with pipe cutting and fitting and other mechanical departments, to cost about \$60,000 with equipment. N. B. Fleming, Commercial Building, is architect.

Ben Hur Erection Co., 5100 Farlin Avenue, St. Louis, structural steel erector, has plans for a one-story unit at equipment storage and distributing plant, 70 x 145 ft., to cost about \$30,000.

W. C. Norris Mfg. Co., 6 North Frisco Avenue, Tulsa, Okla., has plans for a one-story machine shop, 40 x 85 ft., to cost about \$25,000 with equipment. J. W. Robb 1114 South Boston Street, is architect.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has revised plans for additions to repair shops and utility buildings at Emporia, Kan., consisting of eight one-story units, to cost \$150,000 with equipment. W. H.

Wagner, Topeka, Kan., is chief engineer.

State Board of Administration, State House, Topeka, Kan., H. E. Schrack, business manager, has plans for a two-story industrial school at State School for Deaf, Olathe, to cost about \$40,000. Charles D. Cuthbert, State House, is architect.

A. S. Jones Mfg. Co., Tulsa, Okla., manufacturer of amusement park equipment and devices, including operating equipment, is considering removal of plant to Joplin, Mo., where a main works will be established, to cost over \$45,000.

Indiana

INDIANAPOLIS, June 10.—Plans have been approved by Warner Gear Co., Muncie, manufacturer of automobile gears and assemblies, for one-story addition, to cost over \$100,000 with equipment.

United States Encaustic Tile Co., 349 West Sixteenth Street, Indianapolis, is completing plans for a one-story addition to cost about \$90,000 with machinery.

City Council, Indianapolis, has approved plans for municipal airport on 1000-acre tract near Ben Davis. Bond issue of \$693,000 has been sold. Project will consist of two hangars, machine and repair shops, oil storage and other units. McGuire & Shook, 941 North Meridian Street, are architects. Paul H. Moore is airport manager, in charge.

Indiana Lamp Corporation, Connersville, a division of Allied Products Corporation, Detroit, is developing additional facilities for production of lamps for aircraft, formed of duralumin, and will establish department for this branch of output.

New Indiana Chair Co., Mill and Twelfth Streets, Jasper, has awarded a general contract to Carl A. Keller, 818 DuBois Street, Vincennes, for one and two-story addition, 200 x 300 ft., to cost about \$80,000 with equipment. Edwin C. Berendes & Associates, McCurdy Building, Evansville, are architects.

Electric Sprayit Co., Stephenson Building, South Bend, manufacturer of spraying equipment, has taken bids on revised plans for one-story unit, to cost \$50,000 with equipment. William E. Fett, Associates Building, is architect. C. A. MacDonald is secretary.

Macy Conveyors, Inc., Decatur, Ind., has been organized to manufacture portable conveyors and has purchased a local building for establishment of a plant. I. W. Macy is president and general manager; John H. Heller, vice-president, and Lee Yager, secretary.

Canada

TORONTO, June 10.—Machine tool sales for May were on a par with those for the previous month. Manufacturers report operations at a satisfactory level, with production about 10 per cent ahead of that of a year ago. Unfilled orders are in good volume and the steady flow of new business assures present operations for some time. Many structures under way will soon be ready for equipment and dealers are looking forward to some substantial lists.

According to a statement by R. S. McLaughlin, president, General Motors of Canada, Ltd., Oshawa, Ont., plant at St. Catharines, Ont., recently acquired from McKinnon Industries, Ltd., will be ex-

tended to manufacture axles and other parts including electrical equipment, transmissions, shock absorbers, etc. Walkerville plant also will be enlarged, to include production of truck and bus bodies. Chrysler Motor Corporation, which is occupying former Fisher Body plant at Walkerville, will vacate building, which will be used for expansion by General Motors.

Plans for proposed Canadian National Railways-Wabash yards at Tecumseh, Ont., have been approved. Project includes erection of shops, roundhouse and other terminal facilities.

Contract for new \$1,000,000 docks at Hamilton, Ont., for Steel Co. of Canada, Ltd., has been awarded to Nelson River Corporation, Toronto.

Champion Spark Plug Co. of Canada, Ltd., Windsor, Ont., will start work at once on an addition to more than double present plant, to cost about \$150,000.

A number of subcontracts have been awarded for a \$250,000 addition to plant of Guelph Stove Co., Guelph, Ont.

Simmons, Ltd., 400 St. Ambrose Street, Montreal, has let general contract to Anglin-Norcross, Ltd., 2063 Victoria Street, for an addition to its plant.

Shawinigan Water & Power Co., Shawinigan Falls, Que., has organized Shawinigan Stainless Steel & Alloys, Ltd., which will produce stainless steel and similar products, mainly for parent company and its subsidiaries. It is understood management of new company will be same as Shawinigan Chemicals, a subsidiary of Shawinigan Water & Power Co.

Empire Brass Mfg. Co., London, Ont., has taken over plumbing supply business of Canada Metal Co., Toronto. Other departments of Canada Metal Co. have not changed hands.

Foreign

FOLLOWING a consolidation of interests and trade agreement between Lautaro Nitrate Co., London, England, and Anglo-Chilean Consolidated Nitrate Corporation, 120 Broadway, New York, plans are being arranged for new works to cost about \$20,000,000, using Guggenheim process, controlled by last noted company. A subsidiary of both companies will be formed with capital of 4,000,000 shares of stock, no par value, to carry out project.

Willys-Overland Co., Toledo, Ohio, is said to have plans for a new assembling plant at Antwerp, Belgium, for Overland and Whippet automobiles, to cost more than \$500,000 with equipment. Company is operating similar works in England and Germany.

Ventures, Ltd., Montreal, headed by Thayer Lindsley, has purchased nickel refining plant and properties of Kristiansand, Ltd., Falconbridge district, Southern Norway, and is organizing a subsidiary under name of Falconbridge Nickel Factory, Ltd., to take over plant. Expansion and improvement program to triple present output has been authorized, to cost more than \$2,500,000.

Port and Railways Administration, Lourenco Marques, Portuguese East Africa, has awarded a contract to local company for a pre-cooling and cold storage plant, and contractor is considering use of American-made electrical machinery for project. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Portuguese East Africa No. 307360.

Pacific Coast

SAN FRANCISCO, June 6.—Plans are under way by El Travia Industrial Terminal Corporation, 6600 Lexington Avenue, Los Angeles, for twelve-story plant, 150 x 980 ft., to cost about \$5,000,000, to be occupied by a group of manufacturers of aircraft and aircraft accessories. O. R. Angelillo is company engineer, address noted.

Procter & Gamble Co., Cincinnati, has purchased 20-acre tract at Long Beach, Cal., and is said to be planning new multi-story plant for soap manufacture, to cost more than \$750,000 with machinery.

Kinner Airplane & Motor Corporation, Los Angeles, is arranging for increase in stock, to provide about \$1,200,000 part of the fund to be used for expansion. Work will include additions to local plant to cost about \$200,000, of which more than one-half will be expended for equipment.

Counterflo Heater Co., 1929 South Second Street, West, Salt Lake City, Utah, has awarded a general contract to G. H. Magdiel, 600 N. E. Capitol Street, for one-story foundry, 40 x 100 ft., to cost about \$21,000 with equipment.

General Petroleum Corporation, 1710 Sixteenth Avenue, S. W., Seattle, has taken out a permit for additions and improvements in oil storage and distributing plant, to cost \$120,000 with equipment.

City Council, Nogales, Ariz., is plan-

ning installation of power equipment, pumping and other machinery for municipal water system, to cost \$100,000. A bond issue is being arranged.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has plans for a one-story automobile service, repair and garage building for company motor trucks and cars, to cost about \$100,000 with equipment.

Holland Fertilizer Co., 1452 Grant Street, Bellingham, Wash., is reported planning new plant near city, with power house, to cost more than \$85,000 with machinery.

Board of Education, San Diego, Cal., plans construction of one-story vocational shop for new Herbert Hoover high school group at East San Diego, for which an appropriation of \$400,000 has been made. T. C. Kistner & Co., Spreckels Building, San Diego, and Architects Building, Los Angeles, are architects. Bids will be asked on general contract at once.

Standard Paper Box Co., Los Angeles, has plans for seven-story and basement factory, 50 x 145 ft., for manufacture of cardboard and paper boxes and containers, to cost over \$200,000 with machinery. Edgar H. Cline, Petroleum Securities Building, is architect.

Great Northern Railway Co., St. Paul, Minn., will make extensions and improvements in car repair shops at Hillyard, Spokane, Wash., to cost about \$125,000 with equipment. A 5-ton traveling crane will be installed.

New Trade Publications

Nitralloy and the Nitriding Process.—Ludlum Steel Co., Watervliet, N. Y. 32-page brochure giving properties of steels for nitrogen hardening, and detailed instructions for the hardening process, its control, the equipment necessary, and the properties of the hardened surface.

Enduro KA 2 Steel.—Illustrations of equipment for various industries made of this new stainless alloy marketed by Central Alloy Steel Corp., Massillon, Ohio; Ludlum Steel Co., Watervliet, N. Y. and Babcock & Wilcox Tube Co., New York.

Welded Pressure Vessels.—Bulletin 506, A. O. Smith Corporation, Milwaukee. Illustrates equipment (largely for the chemical and process industries and made by a special electric welding process) which is larger in size, or capable of withstanding higher pressures or temperatures, than similar vessels made in other ways.

High Test Welding Rod.—Oxweld Acetylene Co., New York. 12-page pamphlet describing development of alloy steel welding rod which gives joints 11,000 lb. per sq. in. stronger than those possible with best Norway iron rods.

Jessop's Steels.—112-page pocket-size book describing the various brands, and the sizes and shapes stocked or manufactured by Jessop Steel Co., Washington, Pa. Most of the production is special and tool steel, in bars and blocks, although sheet, strip, thin plate and cold drawn shapes are also made.

Clip Machines.—Consolidated Expanded Metal Companies, Wheeling, W.

Va. Four-page folder illustrating and describing a portable device for making hairpin clips used in attaching expanded metal to structural steel. In particular, suspended ceiling construction is featured. This device makes clips in three sizes and the machine weighs 12½ lb.

Temperature Control.—Weaver Brothers Co., Adrian, Mich. Folder devoted to automatic control devices for pickling tanks as a means to saving acid, steam, time and labor costs. Automatic control is said to result in better pickling.

Diesel Engines.—Busch-Sulzer Brothers-Diesel Engine Co., St. Louis. Picture booklet of 16 pages devoted to four-cycle engines of 150 to 500 brake hp. These are designed to meet the demand for heavy-duty units for stationary or marine service, the latter being both direct and electric drive. There are five sizes, with three, four, five, six and eight power cylinders. Many installation views are shown.

Acid Pumps.—United States Stoneware Co., Akron, Ohio. Bulletin D of eight pages illustrates and describes a line of centrifugal acid pumps lined with chemical stoneware. Details of construction are shown and a considerable amount of information is given as to the characteristics and capabilities of the pumps and the types of acids and other fluids which they can handle.

Elevating and Stacking Equipment.—Revolvator Co., 352 Garfield Avenue, Jersey City. Two folders of four pages each, showing applications of portable hoisting and tiering mechanism for handling materials in industrial or warehouse service.

